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Volume 17 October 1948 Number 10

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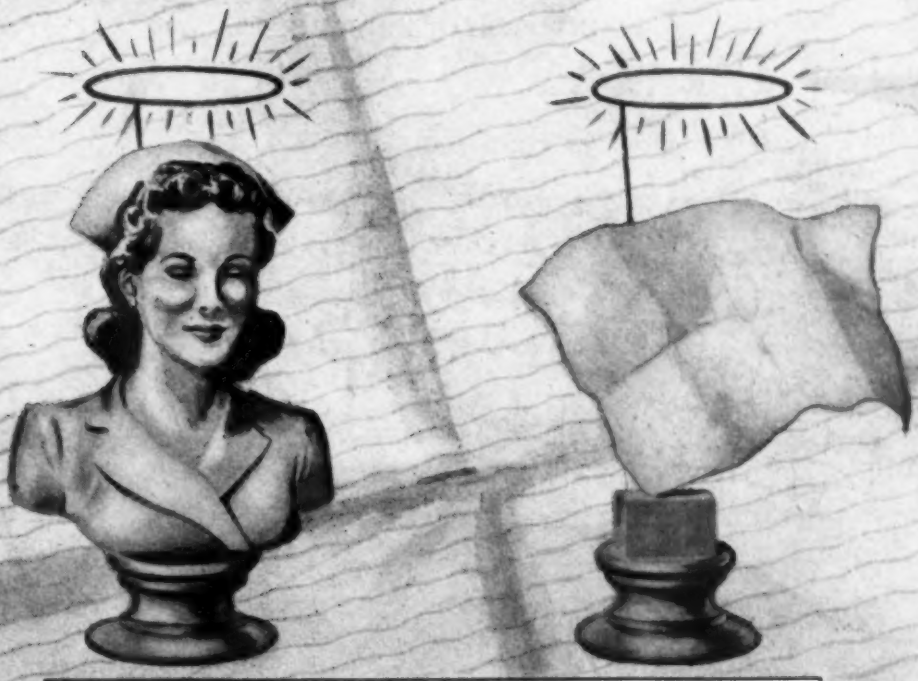

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This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same in the current or any subsequent issues as they may be inclined.

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INDUSTRIAL MEDICINE, The Journal of Industrial Health, Occupational Diseases and Traumatic Surgery. Entered as second class mail matter August 28, 1941, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879. Additional entry at Sheboygan, Wisconsin. Published on the fifth of each month by INDUSTRIAL MEDICINE PUBLISHING COMPANY, Chicago (publishers also of INDUSTRIAL NURSING, issued monthly, and AMERICAN INDUSTRIAL HYGIENE ASSOCIATION QUARTERLY). STEPHEN G. HALOS, President; A. D. CLOUD, Publisher; C. O. SAPPINGTON, M.D., DR. P.H., Editor; CHARLES DRUECK, JR., Secretary and Treasurer; STEPHEN G. HALOS, Advertising and Business Manager. Member, Audit Bureau of Circulations. PUBLICATION, EDITORIAL and EXECUTIVE OFFICES: 605 North Michigan Avenue, Chicago 11, Illinois. Subscription $5.00 per year in the United States; $5.50 per year in Canada; $6.00 per year in other countries. Single copies 75 cents. Title Registered in United States Patent Office.

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DR. DAVID W. FASSETT joined the staff of Eastman Kodak Company's Laboratory of Industrial Medicine, August 16, 1948. He will be associated with DR. JAMES H. STERNER in the management of industrial hygiene problems in the company plants and in the other activities in industrial medicine performed by this laboratory. DR. FASSETT was graduated from Columbia University in chemistry, following which he spent several years in post-graduate work in biochemistry with Dr. Hans Clarke, Professor of Biochemistry at the College of Physicians and Surgeons, Columbia University. He later became a pharmacologist with the Wellcome Research Foundation, after which he returned to New York University Medical School and received his M.D. degree. Subsequently he

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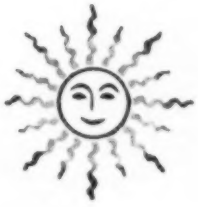

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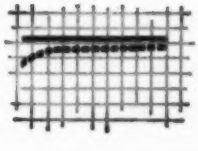

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became a Fellow and later an Assistant in Therapeutics in the Department of Medicine, New York University Medical School. During the war he was Acting Chief, Division of Pharmacology, Food and Drug Administration, Federal Security Administration, Washington, and for the past two years has been in the private practice of internal medicine and cardiology in Miami, Florida.

DR. JOHN J. POUTAS, formerly assistant medical director and chief of professional services in the New England office of the Veterans Administration, has been appointed Medical Director of Lever Brothers Company, Cambridge, Massachusetts. DR. POUTAS will direct the health and medical services which the company maintains for its 6,000 employees, including clinics in all plants. A resident of Waltham, Massachusetts, DR. POUTAS for 12 years held important medical administrative posts in the Massachusetts Department of Public Health. As Director of Local Health Administration, he received a leave of absence in 1942 to enter the U.S. Army Medical Corps. After service in Germany with the Fifteenth Army Surgeon's Office and the Surgeon's Office of U.S. Forces European Theatre, he was discharged in June, 1946, with the rank of lieutenant-colonel. Joining the Veterans Administration, he was named clinical director and chief of professional services at the Veterans Hospital at West Roxbury, Massachusetts. He was promoted to his position in the New England branch office May 1 of this year. He is a member of the faculty in the department of epidemiology at the Harvard School of Public Health, and secretary of the Public Health Committee of the Massachusetts Medical Society. He is a graduate of Boston College, Harvard Medical School, Harvard School of Public Health, and Newton-Wellesley Hospital.

SIX potteries located in East Liverpool and Wellsville, Ohio, and in Chester and Newell, West Virginia, employing approximately 6700 persons, announce the appointment of JOSEPH T. NOE, M.D., as the new Medical Director for the group. While the plants are in two states, they are clustered within four miles of the center of East Liverpool and are engaged in the same

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general type of chinaware manufacturing. The group plan of medical supervision was initiated three years ago, under the direction of ELMER F. HERRING, M.D., who resigned August 1, 1948, to specialize in chest work in San Fernando, California. DR. NOE, who will assume his new duties in September, comes from East Chicago, Indiana, where he has been Assistant Medical Director for the Inland Steel Company. He is a graduate of the University of Louisville, Kentucky, Medical School and served as a major in the Army Medical Corps during World War II. He is a member of the American Medical Association and the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS. The six potteries joined in this group medical plan are the Homer Laughlin China Company and the Edwin M. Knowles China Co., of Newell, and the Taylor, Smith & Taylor Company and the Harker Pottery of Chester, in West Virginia, with the Hall China Company, or East Liverpool, and the Sterling China Company, of Wellsville, in Ohio.

THE National Security Resources Board has announced appointment of a Medical Advisory Committee to consult with the Board on security aspects of public health. The Committee will work in cooperation with DR. JAMES A. CRABTREE, Director of the Board's Medical Services Division. Other members of the new group are: DR. WILLIAM P. SHEPARD, San Francisco; DR. A. C. BACHMEYER, Chicago; DR. JAMES C. SARGENT, Milwaukee; DR. EDWARD L. BORTZ, Philadelphia; DR. MICHAEL E. DEBAKEY, New Orleans; and DR. PERCY T. PHILLIPS, New York. DR. SHEPARD is associated with the Metropolitan Life Insurance Company and is in charge of its health and welfare activities in the western part of the United States. He has been active for many years in the American Public Health Association, the National Tuberculosis Association and various other voluntary health agencies.

Ninth Industrial Health Congress

THE Ninth Annual Congress on Industrial Health under the sponsorship of the American Medical Association will be held early in 1949. "Health for the American Worker" will be the central theme of this session

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1. Grinnell, E.: Journal-Lancet 68: 121 (Apr.) 1948.

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59th Annual Meeting, November 21, 22, 23, 1948, at the Palmer House, Chicago

INDUSTRIAL MEDICAL AND RELATED ORGANIZATIONS

Aero Medical Association of the United States; Secretary: DR. D. S. BRACHMAN, 1016 Dime Bldg., Detroit 24.

American Academy of Occupational Medicine; Secretary, JAMES J. CARLISLE, M.D., 550 Hillcrest, Westfield. N. J.

American Association for the Advancement of Science, 1515 Massachusetts Ave. N.W. Washington, 5, D. C. September 13-17, 1948.

American Association of Industrial Dentists, 4604 South helsea Lane, Bethesda 14, Maryland. V. J. FORNEY, D.D.S., Secretary-Treasurer.
Early April, 1949; Detroit.

American Association of Industrial Nurses, 654 Madison Ave., New York 21, N. Y. GLADYS L. DUNDORE, R.N., Executive Secretary.
Early April, 1949; Detroit.

American Association of Industrial Physicians & Surgeons, 28 East Jackson Blvd., Chicago 4, Ill. EDWARD C. HOLMBLAD, M.D., Managing Director and Treasurer.
Early April, 1949; Detroit.

American Association of Railway Surgeons, 547 West Jackson Blvd., Chicago 6, Ill. R. B. KEPNER, M.D., Secretary.
November 21-23, 1948; Palmer House, Chicago.

American Chemical Society, 1155 Sixteenth St. N.W., Washington 6, D. C. A. H. EMERY, Secretary.

American College of Physicians, 4200 Pine St., Philadelphia 4, Pa. E. R. LOVELAND, Secretary.

American College of Surgeons, 40 East Erie St., Chicago 11, Ill.

American Conference of Governmental Industrial Hygienists, U. S. Public Health Service, Washington, D. C. J. J. BLOOMFIELD, Secy-Treas.
Early April, 1949; Detroit.

American Industrial Hygiene Association, 4400 Fifth Ave., Pittsburgh 13, Pa. HENRY F. SMYTH, JR., Executive Secy.
Early April, 1949; Detroit.

American Medical Association, Council on Industrial Health, 535 North Dearborn St., Chicago 10, Ill. CARL M. PETERSON, M.D., Secretary.
which will fill the gap left by the National Health Assembly held in Washington last May. There was no industrial health panel at the Washington meeting. Four principal panels: industrial health, medical service, health education, and preventive medicine and public health are planned. Each will develop recommendations which will be correlated at the final general session. Certain discussions will extend those held in Washington.

New Slant on Movies

A MOTION picture producer is publishing a booklet describing how to prepare a film before sending it to a recording studio to have it converted from a silent to a sound version. The booklet furnishes simplified footage scale charts, layout for the preparation of the script, and other important information. All 16-mm film, whether photographed at 8, 16, 24 or 64 frames per second, is adaptable to sound. After the film, whether black and white or color, is prepared, a high fidelity sound track can be placed on it by this producer for a very nominal fee. This booklet, No. 322 entitled "Make Your Movies Talk," can be obtained gratis by writing to INDUSTRIAL MEDICINE.

DR. VICTOR C. MYERS, Industrial Health Physician for the Michigan Health Department, Lansing, was killed in an automobile accident on July 30. DR. MYERS was born in 1914; graduated M.D. at Creighton University School of Medicine, Omaha, Nebraska, 1940.

American Medical Association, 535 North Dearborn St., Chicago 10, Ill. GEORGE F. LULL, M.D., Secretary & General Manager.
Interim Session, November 30-December 3; St. Louis.

American Public Health Association, 1790 Broadway, New York 19, N. Y. REGINALD M. ATWATER, M.D., Executive Secretary.
November 8-12, 1949; Boston.

Association for the Surgery of Trauma.

Canadian Public Health Association, Vancouver, B. C., Canada.

Council on Industrial Health, American Medical Association; Secretary: CARL M. PETERSON, M.D., 535 N. Dearborn St., Chicago 10.

Industrial Hygiene Foundation of America, 4400 Fifth Ave., Pittsburgh 13, Pa. JOHN F. MCMAHON, Managing Director.
November 17-19, 1948; Pittsburgh.

International Association of Industrial Accident Boards & Commissions, MARSHALL DAWSON, U. S. Dept. of Labor, Washington, D. C., Secy-Treas.
September 12-18; New York.

Lead Industries Association, 420 Lexington Ave., New York 17, N. Y. ROBERT L. ZIEGFELD, Secretary-Treasurer.
November 15-16; Chicago.

National Council on Rehabilitation; Secretary-Treasurer: MR. HOLLAND HUDSON, 1790 Broadway, New York 19.

National Metal Congress, Philadelphia.
October 25-28; Philadelphia.

National Rehabilitation Association, 411-7th Ave., Nashville 4, Tenn. LOUIS R. SCHUBERT.
December 6-10, 1948; Madison, Wis.

National Safety Council, 20 North Wacker Drive, Chicago 6, Ill. NED H. DEARBORN, President; CARMEN FISH, Secretary.
October 18-22; Chicago.

National Tuberculosis Association, 1790 Broadway, New York 19, N. Y. H. STUART WILLIS, Secretary.

Saranac Laboratory of Edward L. Trudean Foundation, 7 Church Street, Saranac Lake, N. Y. ARTHUR J. VORWALD, M.D., Director.

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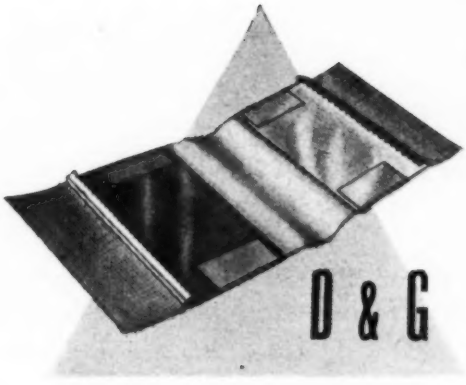

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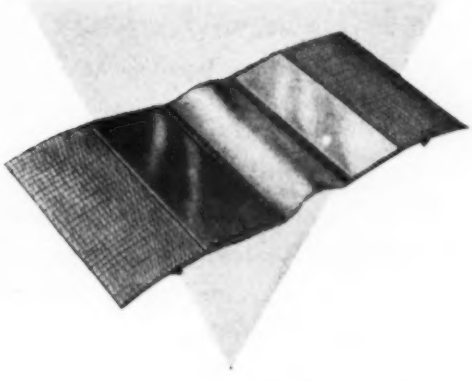

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While formerly carbohydrate was considered the chief factor in the maintenance of hepatic function, protein is now regarded one of the most important dietary principles in safeguarding the integrity of the liver. Unless given with adequate amounts of protein, carbohydrate alone is ineffective. For this reason, the modern dietary of many hepatic affections provides protein in abundance in addition to carbohydrate.

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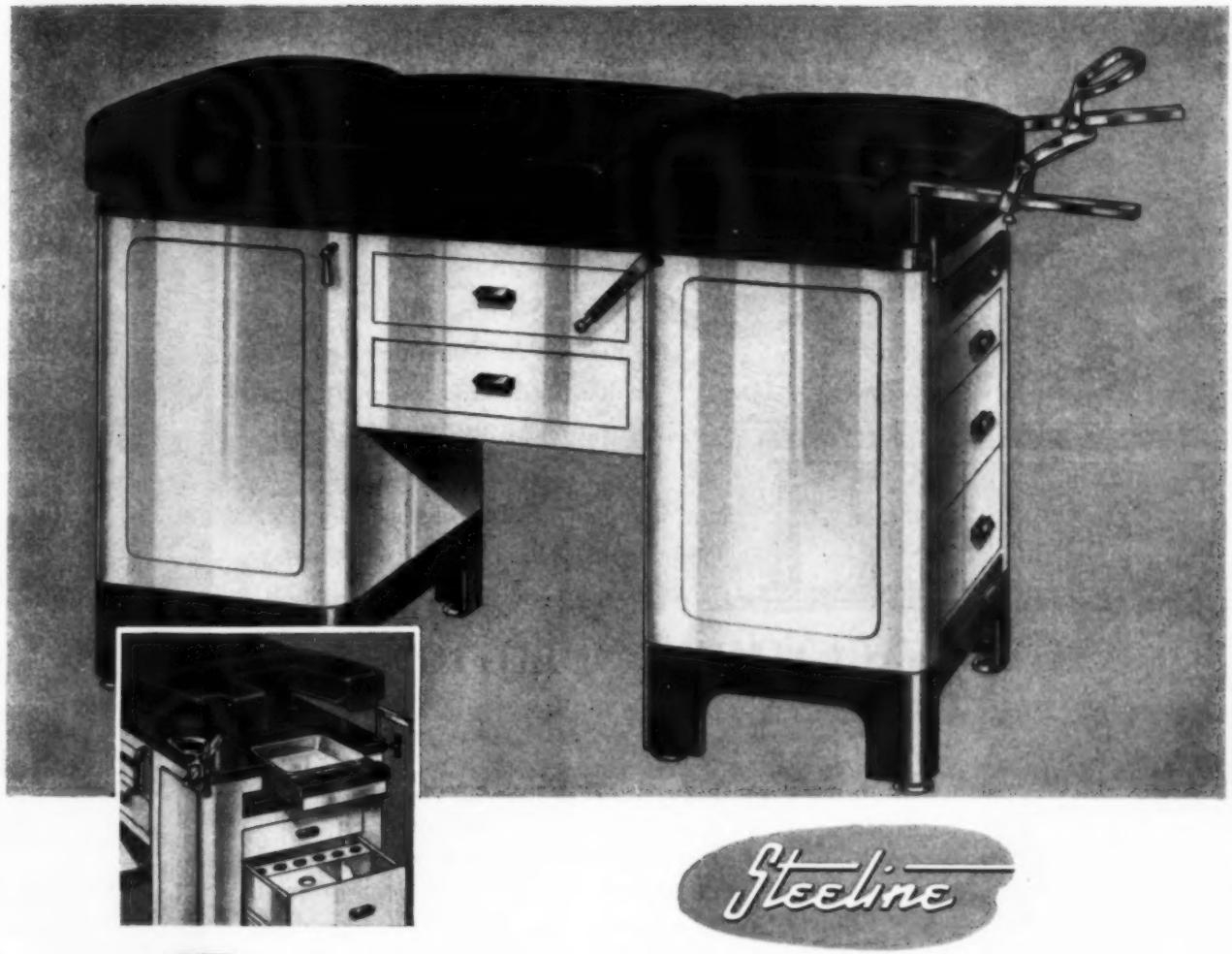

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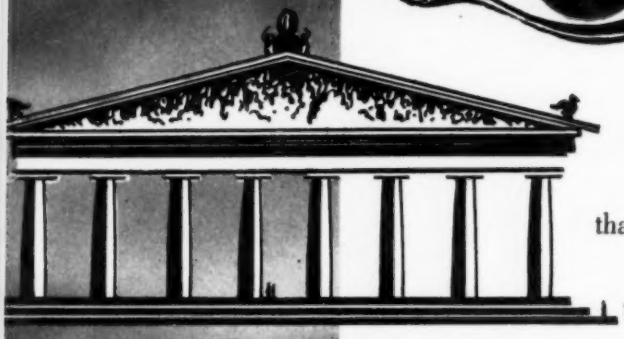

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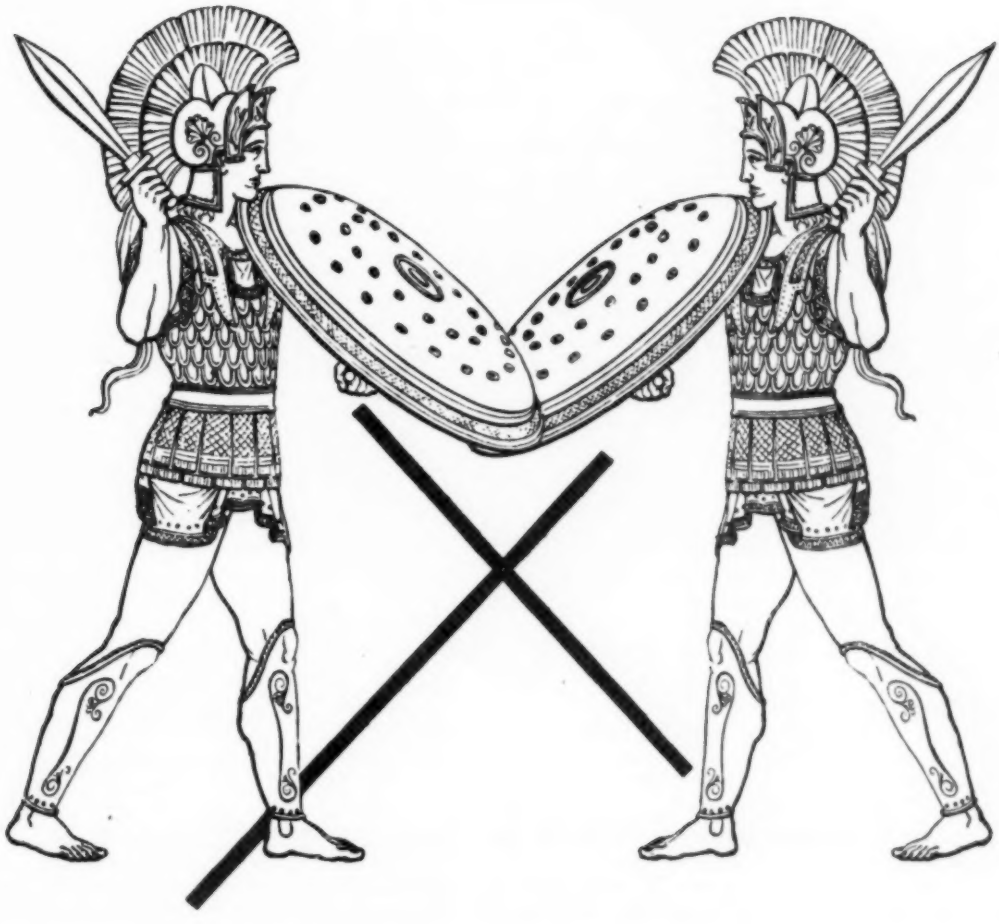

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1. Editorial: J. A. M. A. 129:74 *(Sept. 1)* 1945

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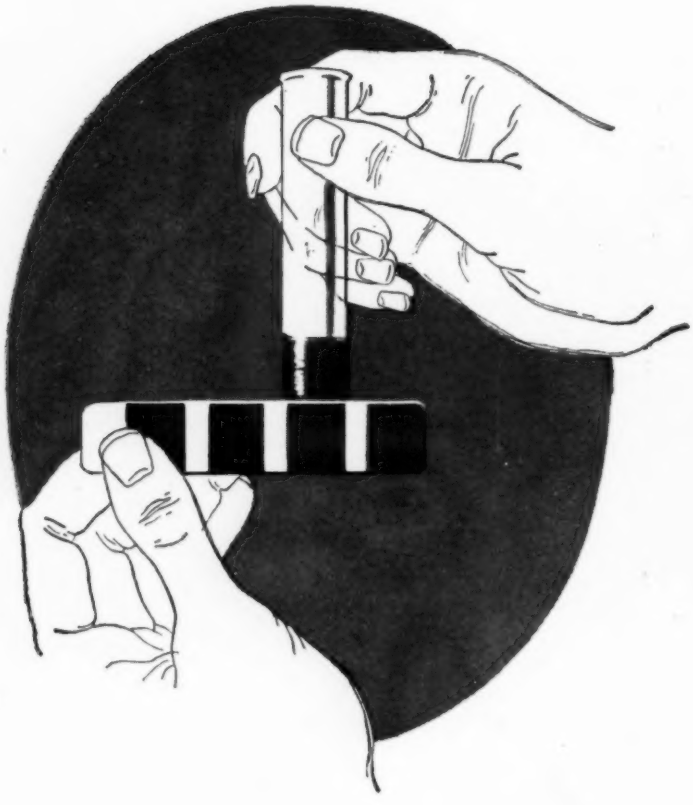

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INDUSTRIAL MEDICINE

Volume 17 OCTOBER 1948 *Number 10*

Problems Relative to Possible Physiological Effects Caused by Radiation

FRED A. BRYAN, M.D.,
Assistant Director, Atomic Energy Project,
Associate Clinical Professor of Medicine,
University of California at Los Angeles

As WITH all new materials, numerous problems confront those who attempt to use them. This is especially true in the use of radioactive materials, particularly since the advent of the artificially produced radio-isotopes and fission products. I shall try to present some of these problems to you: first, from the viewpoint of the possibility of exposure; secondly, from the viewpoint of the physiological effects which might be encountered if personnel are exposed; and thirdly, the problems encountered in maintaining safe practice and good health in the personnel using these materials.

We might now consider one of the specific cases in which we might expect numerous hazards of varying degree which might occur during normal peace time use. Under these types, one would probably first consider the pile. As you probably know if you have read the Smythe Report, the pile as used in the United States consists of a carbon lattice with the specifically shaped uranium slugs spaced at calculated intervals throughout the lattice. The primary purpose of the pile was in the production of the transuranic elements. However, as suggested by the Smythe Report and as a definite possibility suggested by others, the pile could be adapted to produce energy as well as the production of the transuranic elements. There is one other use for the pile which comes to mind: that many of the radio-isotopes can be produced in the extremely intense neutron flux within the pile. All of these uses can be considered as definite peace time uses and, when the newness wears off the popular conception of atomic energy, they will undoubtedly be considered normal. Most of the personnel concerned with the operation of a pile are technically trained. However, as the pile is used more and more and new locations are put into operation, there will not be enough technically trained personnel so that some of the well controlled safety measures now in operation will have to be thoroughly inculcated into the non-technically trained operators.

For example, one possible hazard from the normal operation of a pile is the air contamination from stack gases in air-cooled piles. These gases contain such materials as radio-xenon, radio-iodine, etc. Unless the gases are scrubbed or meteorological conditions are such that they are immediately diluted and carried high into the atmosphere and away from inhabited sections, they could cause a definite damage to humans, animals and crops. The personnel directly concerned in the operation of a pile would necessarily have to be shielded from the direct radiations, not only during full operation, but during the chemical separation of the transuranic element from the uranium slug as described in the Smythe Report. There would also be very definite hazards to be guarded against during repairs and maintenance in the operation of a pile. In the control laboratories many highly radioactive isotopes are encountered and it is necessary to maintain extreme fastidiousness, not only to the personnel themselves, but of the laboratory equipment and laboratory bench tops. This is quite necessary when one realizes that perhaps spillage of only a minute amount of one of the solutions containing highly radioactive materials could contaminate a whole laboratory and even the surrounding area. Undoubtedly this same contamination would be present in the air as fine dust, since the solution would dry and be scuffed from the floor into the air. Thus personnel could easily be exposed by inhalation of such highly radioactive particles.

Some of the preventive measures which can be taken against contamination of these laboratories are the use of survey meters to detect small spillages, the use of rubber gloves to protect the hands of the personnel and the use of either washable or disposable laboratory smocks and shoe covers. It is also the practice in some instances where the materials handled are highly radioactive, to monitor the hands of individuals before leaving the laboratory and to require the change of shoes before leaving the laboratory.

To make things even a bit more difficult in this type of laboratory, one has to consider the disposal of waste material. For example, waste filtrates, washings from glassware, waste precipitates collected on filter papers or other filtering material, and numerous other wastes are all radio-active to some degree. The problem becomes not one of disposal but one of accounting and tracing. The usual methods of waste disposal in laboratories by throwing them down the drain and the sink or placing material in open trash

Presented at the Seventh Annual Meeting of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, April 10, 1948, San Francisco, California.

cans have to give way to planned procedure of the utmost care from all concerned. For example, specifically marked containers which must necessarily be leak-proof must be placed in the laboratories for collection of all such materials and these containers are collected each day and transported either to a specifically marked area where the contents are buried or transported out to sea where the contents are sunk in very deep water.

In the use of radio-isotopes, which may also be considered a normal peace time use, the greatest hazard is, and will undoubtably continue to be for some time, the lack of knowledge on the part of the people using these materials. By lack of knowledge, I mean the knowledge concerned with the physiological and toxicological effects of the materials used. Most investigators do not realize that many of the isotopes used are selectively absorbed or combined with proteins. When one thinks of the large amount of protein or protein-like materials in sewage, one soon finds that the radioactive material can be concentrated rather than diluted as might appear at first thought. Again, if a number of investigators are grouped in one area as, for example, at a university or some research center, each investigator is likely to forget that his co-workers may also be using a radioactive material and so the sewage system for this area could possibly become highly contaminated. This contamination could easily spread, according to the type of sewage disposal system used in the area concerned. For example, if the sewage were dumped into the ocean, even at a distance offshore and even though it were chlorinated, the radioactive material would still persist and, since it is attached to the protein-like materials, would become food for the plankton and minute sea life. These small animalculae would become radioactive and would be eaten by small fish who in turn would become radioactive and would be eaten by larger fish who in turn, etc. . . . . , the amount of radioactivity becoming progressively more concentrated. Thus, by means of edible fish, it is possible that the radioactivity could be transferred to the populace. Admittedly, this sounds very farfetched at present, but if much work is done and the work is carried out over a long period of time—let us say for 10, 15 or 20 years—this assumption is not as fantastic as it sounds.

As far as the use of isotopes in manufacturing is concerned, many of the same problems are present and, unless strict controls are enforced, the problems will differ only in degree since, in manufacturing, larger amounts would be used and the problems would become greater.

It might be of interest here to state the accepted tolerances on various types of radiation which might be encountered.

EXTERNAL RADIATION

X-rays and gamma rays	.1	r/24	hours	total	body	radiation	
Beta rays	.5	r/24	"	"	"	"	
Neutrons	.007	n/24	"	"	"	"	(.014 r/day)

In the case of alpha radiation, no external tolerance value is necessary because the skin is an effective barrier, but since it can enter the body as finely divided substance in the air, the tolerance has been set as 10 micromicrocuries per liter of air. One can gain some idea of the minuteness of this amount from the fact that 10 micromicrocuries of radium is approximately 1×10^{-5} micrograms.

If we consider the physiological effects of these various types of radiation, we must in general arrive at the conclusion that all types have the same final effect, namely the death of the tissue unit or cell. The apparent differences in the type of radiation are in general due to the penetrating power of the types of radiation encountered. Numerous experiments have been done on animals in which they have been exposed to gamma radiation, beta radiation, etc. From these various experiments, it can be said from present knowledge that these radiations produce no circulating toxins or substances detrimental to cell growth. At least none have been detected in cross-circulation experiments where the circulation of one animal is directly connected to the circulation of another, the first animal being radiated while the second is shielded from radiation. This type of experiment is quite delicate and, so far, has shown no detrimental effect of the unradiated animal. It is felt that the action of these radiations is to cause cessation of or abnormal mitosis with subsequent death or sterility of the daughter cells.

Perhaps to understand the present-day theories of how these radiations affect normal mitosis, one might consider a large cell—let us imagine a cell approximately two to three feet in diameter—and would find that it would have a thin outer membrane or skin possibly resembling a large balloon. Inside this skin we find a semi-liquid or colloidal suspension of organic material which is known as protoplasm. Suspended somewhere within this volume of semi-liquid is a mass of specialized tissue, possibly the size of a large grapefruit or mellon. This material is known as the nucleus of the cell. Within this nucleus are the chromosomes and genes which control such factors as whether we have blue eyes or brown, the color of our hair, whether we're male or female, white or black—in fact, every characteristic of our bodies. These genes might be considered to be living molecules and are thought by many scientists to resemble the so-called viruses in their physical characteristics. It is known that viruses can be killed by a direct hit on one of these "living molecules" by the quantum of energy contained in a single gamma ray or by direct hit of a beta particle and it is thought that this "death" is due to ionization of the molecule. If we assume that the genes react in the same way as the viruses we can then kill or destroy single genes. If, in a cell, we do destroy one or more of the

genes, then normal mitosis and normal daughter cells cannot be produced. If the gene so destroyed has very little to do in the actual life of the cell but has some minor characteristic, then we have a so-called mutation. However, if the gene is quite important, then we produce what is called a lethal mutation; the daughter cells are unable to survive. If we return to our two or three foot cell and imagine that we are standing some distance away with a shotgun loaded with fine buckshot and aim it at this cell, it can be seen that many of the particles of the buckshot, due to spread, will miss the cell entirely. Others will pass through the semi-liquid protoplasm and cause no difficulties. Others by chance will pass through the protoplasm and through the nucleus and not strike one of the genes. This will cause no difficulty. Others may strike the genes glancing blows and cause no difficulty. However, depending upon the amount of buckshot, we should be able to hit at least one gene a direct blow and thus be able to change the characteristic of any daughter cell produced from this original cell. Admittedly, this is a rather crude explanation but, until more experimentation has been done and more data collected, it is probably no more crude than our hypothesis as to the mode of action of the various types of radiation. This foregoing explanation is an attempt to explain the delayed results of radiation and those results not directly visible to the naked eye. It is true that if great enough doses are given of any types of radiation, the cells themselves are killed without any necessity for action on the genes or chronosomes.

As to specific effects which you, as the physician, can find, we must more or less confine ourselves to a consideration of high dosage and, in general, all types of radiation produce all of these effects but to a varying degree, depending again upon their intensity and penetrating power. Probably the most noticeable effects of high dosage are burns of the skin. These burns may be quite superficial, resembling sunburn, or they may be quite deep and resemble a third degree burn seen from high pressure steam or electrical arc, etc. In treatment these burns are treated no differently from burns received in any other way. Following these burns, one might note (and this is still a moot point) a thickening and raising of the resultant scars. This is called keloid formation and does not specifically follow radiation burns but may occur after any injury which causes scarring. It is most noticeable in races with pigmented skins Some other noticeable effects of high dosage radiation are the loss of hair or so-called radiation epilation, formation of cataracts in the lens of the eye. and the possibility of skin cancer production. Other specific effects of high dosage radiation which might not be noticeable to the layman are those found in the hematopoietic or blood-forming system so that the physician may find anemias and, on further inspection, destruction of the bone marrow and lymphoid tissue. This destruction may be complete, in which case death will ensue, or it might be partial and temporary in nature, depending upon the dosage received. One element of the blood, the lymphocyte, is quite sensitive to radiation and with dosage as low as 15 r a lowering in the total number circulating in the blood can be noted. In the reproductive system there will be temporary or permanent castration, depending upon the dosage, in the male or female with subsequent sterility due to the absence of or to imperfect sperm or ova. With this type of reaction there may be loss of libido in the male and cessation of the menses in the female.

As far as the gastro-intestinal tract is concerned, there is a sloughing or casting off of the mucosa or lining of the bowel following a heavy dose and this may, in most cases, be fatal. In milder forms one sees what is called radiation sickness, which is characterized by a feeling of malaise, nausea, vomiting and which is probably related to tissue destruction in the intestine, possibly in the liver, etc. There are other specific effects such as those in which the enzyme systems of the body are affected, the basic metabolism upset, etc., but these are of interest only to the physician specializing in metabolic disorders.

Having presented to you the various hazards and physical effects, I should like now to discuss methods of monitoring and control. One of the simplest methods which we have for monitoring is the use of various types of survey meters. It is true that these meters are limited in their scope but they have a definite place in determining the safety precautions which must be taken. Various materials used can be divided into three general types. First, the ionization chamber type, of which the simplest example is the Landsverk-Wollan Quartz Fibre Meter. A more complicated type, using an amplifying circuit, in the so-called Victoreen 247 in which there are three separate ionization chambers to cover three ranges of intensity. There is also an integrating type which measures total dosage over any given period of time. This is called a Proteximeter and is manufactured by the Victoreen Company. A second type of meter is the electrometer such as the gold leaf electrometer which I imagine many of you saw in your college physics. A type closely resembling this, but more compact, is the Pencil Meter which uses a quartz fiber. A third general type of survey meters depends upon the Geiger-Mueller tube for its action; for example, there are the high and low voltage integrating types, such as the Victoreen 263 and X-263. This type of meter is portable and can be used for survey. Other meters of this type are the proportional counters and scalers. However, these are not portable and are used for fine measurements.

All of the survey instruments described except the Pencil Meter and the Proteximeter are designed primarily for intermittent or spot monitoring. The Pencil Meter can be carried in a man's pocket and will record the dosage of gamma radiation or x radiation received over a period of time (usually not more than eight hours). The Proteximeter is, of course, only semiportable and will record total dosage of gamma or x radiation over a measured period of time. To check further the radiation received by a person, there is available what is commonly called the Film Badge. These badges consist of a flat metal case two inches wide by two and a half inches long and approximately one-eighth of an inch thick. Inside this case is a dental film pack Since x radiation, gamma radiation and beta radiation will effect film, causing a blackening in proportion to the amount of exposure, we then have a method which, on accurate calibration, will allow us to make measurements of either beta or gamma radiation and to keep permanent records of such radiation exposures. This same badge can be used as a device for measuring the amount of exposure to neutrons by use of a cadmium or silver cross of a known, comparatively thick, foil. The technical procedure of calibration and the use of the Film Badge for neutron measurement is too detailed for present discussion. Film may also be used in many other ways for radiation detection; for example, finger rings which resemble large signet rings and contain a small disk of photographic film are used for monitoring hands exposed to radiation. Areas may also be monitored by placing Film Badges in strategic points. Radioautographs are still another use of photographic film in that such objects as small animals, plants, leaves, bits of dirt or, in fact, any material can be placed on a film which is protected from normal light and, after a suitable length of time, the film developed and it will be found that the object has photographed itself by means of its radioactivity. By use of special types of film it is possible to do alpha radiation measurements. By this procedure the track of the alpha particle shows on the film as a tiny short line and the number of streaks may be counted on a low power microscope, thus giving the number of particles for the length of time the film was exposed.

For calibration of films and meters it is necessary to obtain suitable sources of radiation. For example, to calibrate a survey meter for use with x or gamma radiation, one would use a radium source. A radium source consists of a radium salt enclosed in a small capsule of platinum-iridium. It is known that one milligram of radium or radium-equivalent enclosed in a capsule of 0.5 millimeters wall thickness of platinum-iridium will produce 8.4 roentgens per hour at a distance of one centimeter. This gives us a basic figure for calibrating a meter and other values can be obtained quite easily, since the inverse square law holds for this type of radiation as well as for visible light, so that if we move our meter 10 centimeters from the one milligram source rather than one centimeter, we would receive one hundredth of the radiation per hour, or .084 r per hour. For calibrations of beta radiation we encounter a little more difficult procedure since beta radiations are of many and varied energies. Here we must be careful that we realize the energy of the beta radiation as well as the amount since, in general, the higher the energy the more penetrating the radiation. On low-energy beta rays we might find that they would not even penetrate the wall of the survey meter. However, for a general calibration one could use uranium metal since the peak energy of the beta rays from this material is quite high. Here an additional factor enters in that beta radiation is absorbed by air. However, one may actually obtain rough calibrations by use of the uranium metal source.

The scaler type of counters can be calibrated with extreme accuracy by use of very thin mica-windowed Geiger-Mueller tubes and by use of a specially prepared uranium metal foil source. Alpha calibrations are of use only in the alpha-proportional counters and special scaler-type counters and will not be discussed here.

There is another way of measuring radiation than by the use of films, survey meters or other inanimate objects in that it is possible to obtain very rough measurements by biological means. For example, to obtain some pertinent data on the effects of the various radiations in regard to their energy and amount (since one could hardly expose human beings) various species of animals are exposed to various types of radiation in various amounts and at various energy levels. Following this exposure, the animals can be studied for decrease in life span, changes in the components of the blood and, in animals with short life cycles, the effects on heredity can be studied. It is by the use of these animals that we can determine some of the tolerance levels for the various types of radiation measurement more accurately than at present. It must be realized however that this type of monitoring or experimentation is a long-range operation and might take periods as long as five to 10 years to obtain even preliminary data.

Since alpha radiation presents such a hazard when ingested or inhaled, you can readily see that methods of detection of alpha emitters are of prime importance. There are two common methods by which personnel can be checked on the amount of exposure. First, by what may be described as breath sampling. In this type of check, a large, specially constructed glass ball which will hold approximately three to five liters is carefully decontaminated of all radioactive material. This glass ball or bulb is fitted with stop cocks and, in use, the person to be tested is required to appear in an area as far away from any radioactive materials as possible and is also required to appear approximately 24 to 48 hours after his last possible exposure. The person to be tested then allows his exhaled breath to be

drawn into the evacuated bulb. This bulb is then taken to the electronics laboratory and the collected breath is passed through an alpha proportional counter. By means of the count obtained, one can calculate the amount of alpha emitter present in the body. This is too detailed to attempt to describe at this time.

A second method of check is to collect urine specimens over a period of 24 hours. Here very great care must be exercised that the container for the urine is absolutely free of the active material and that the external genitalia are well cleansed so that no radioactive material might accidentally gain entrance into the specimen. The specimen is then reduced in volume by vacuum distillation and an aliquot placed under the counter, the count here, as in the breath sample, to be correlated with the amount present in the body. Whenever this count is found to be 250 per minute for the total 24-hour specimen of urine, it is the present practice to remove the person from any area or job in which he might gain further exposure. Since the geometry of the counter is 50%, a count of 250 per minute represents 500 actual disintegrations per minute for the 24-hour volume, which is the figure accepted at present as tolerance for an alpha emitter.

In practice, it has been found by experience that in a plant or institution using or producing radioactive materials a special department is necessary to protect the personnel involved. This is true because the subject is quite new, the instruments involved are new and the work rather voluminous, so that the usual safety and medical department would be overburdened if this responsibility were placed on their shoulders. In plants or institutions using more than very small amounts of radioactive materials, it has been found that a section, usually under the direction of a health-physicist who understands radiation and its relation to the human organism, along with a group of trained monitors, who understand their instruments as to their limitations and their repair, can handle this subject quite well. The term "health-physicist" has arisen during war time and signifies a physicist with a knowledge of medicine or the converse. At present there are all too few men trained in such a manner. In a plant with an excellent medical department, the addition of a physicist to the staff to assist the physician in charge can produce creditable results or, vice versa, the addition of a well-trained industrial physician to the research department of a plant can also produce creditable results. Because of the newness of this type of work, the background of medico-legal data is quite meager and it becomes of utmost importance to keep excellent records of frequent personnel physical examinations as well as excellent records of personnel and area monitoring.

One final point as far as personnel is concerned which has not been considered to any length, as far as I can determine, is that of the psychological effect of the various radiation hazards. These hazards may produce neuroses and may even cause definite psychiatric effects in the personnel. On first thought, this may sound rather odd, but if one considers that we are exposing the average citizen to something that he cannot detect by any of his senses, it is somewhat like scaring a young child with stories of the "bogey man." For example, the average citizen has read the newspapers and reports of the bombings of Hiroshima and Nagasaki and has read of the epilation or loss of hair in the population as well as the loss of fertility in men and women and also some of the more lurid, but as yet unfounded, reports on the possibility of cancer production. With this inadequate knowledge, it is very possible that a person working in a plant or an institution using or producing radioactive materials could, on losing some hair from practically any other cause, develop a rather severe anxiety neurosis by the belief that such loss of hair was due to radiation such as he or she had read about in newspapers. Loss of libido in the male, possibly the cessation of the menses in the female, might produce the same type of neurosis. This makes it quite necessary that the persons employed in the use or production of radioactive materials should be given short discussions (perhaps like the safety meetings which are held in a number of plants) and in these lectures they should be informed as to the true facts concerning the effects of radioactivity. It can be said that there is no reason to consider the use of radioactive materials or of atomic energy for peace time uses as any more dangerous than any other type of manufacturing. If all safety procedures are well worked out and diligently applied, then the use of atomic energy or its by-products is as safe as any other type of industrial manufacturing.

The Psychosomatic Aspects of Post-traumatic Edema and Allied States

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THE post-traumatic states, one of which is known as post-traumatic edema, have for many years aroused the interest of industrial surgeons. The etiology and pathogenesis of this condition have been the subject of extensive study without having been completely and satisfactorily explained. With the advances made in surgery of the sympathetic nervous system, not only has the therapy of the above condition become more effective but also some light has been shed upon the physiopathology of the ailment.

Geza de Takats[1,2,3] believed that causalgia, post-traumatic edema and Sudeck's atrophy belong to one pathogenetic group which he named reflex dystrophy of the extremeities. This conception has been made apparently *ex juvantibus*, owing to the beneficial therapeutic effect of a sympathetic nerve block or of sympathectomy upon the pathological conditions. It is believed that on account of alteration of tissues, an exaggerated nutritional reflex is caused, leading to vasomotor and trophic phenomena (De Takats,[2,3] Braeucker,[4] Livingston[5]). Livingston believes that the neurophysiological principle of the so-called "internuncial pool," as introduced by Lorente De No,[6] plays a role in the production of this syndrome.

The internuncial neurons are believed to be interposed between the afferent and efferent neurons taking part in reflex activity. This group of neurons has been called by Lorente De No[6] "the internuncial pool." It is an important spinal receiving center which, if pathologically changed, is able to initiate abnormal peripheral reflexes via the motor anterior horn cells, the sensory posterior horn cells and the sympathetic cells in the formatio reticularis. It may even involve other functionally related spinal and brain centers.

In short, Livingston believes that if the "internuncial pool" is constantly bombarded by peripheral stimuli as represented by trauma, scars or inflammatory processes, it may be transformed into an independent reflex center, causing the syndrome of post-traumatic states. Indeed, Livingston could cure several cases of post-traumatic syndrome by eliminating the "peripheral" trigger points, either by novacaine infiltration or by excision of scars.

The following case from my case records supports Livingston's theory:

A 43 year old male patient received a gunshot injury involving the sciatic nerve, with subsequent flaccid paralysis of the left foot. Two years later, a trophic ulcer developed at the plantar side of the big toe. This ulcer failed to heal. About twice per year, an ascending lymphangitis with multiple abscesses developed. Upon incising one of these abscesses, I found a shrapnel fragment and removed it. The ulcer healed in a very short time and remained healed.

The clinical picture of post-traumatic edema is characteristic and unmistakable if looked for and remembered. In many cases, it is overlooked or misinterpreted as malingering and hysteria.

De Takats[1] gave the following excellent account of the syndrome: "After a mild trauma, there occurs occasionally a peculiar vasomotor and trophic disturbance. The vasomotor disturbance while prominent at first, may later be overshadowed by trophic changes. After the acute symptoms have subsided, there appears a hard nonpitting edema which is frequently accompanied by a paroxysm of pain. The skin is glossy, with a bluish tint, and the extremity is sensitive to draft, temperature and pressure. Sensory disturbances are indefinite; there is often a glove-like hypoesthesia which does not follow any sensory nerve distribution. The muscles at first are hypertonic, due to an increased reflex irritability but later become atonic. Sometimes an increased growth of hair or a weeping eczema appears. The nails become brittle. The bones show a characteristic spotty atrophy. The capsules of the joints shrink."

Often but not always, this edema is associated with pain of the causalgia type as described by Weir Mitchell[7] in 1864. It is an intensive burning pain, intensified by warmth and dependence, active and passive motion, fright, anxiety or unexpected noise. In one of my own cases, the pain was initiated by an olfactory stimulation (the smell of vinegar). The edema was described first by Secretan[8] as plastic and hard, due to formation of connective tissue. He compared it with an elastic pillow.

In most of the publications about this subject, the fact is stressed that very often the trauma is extremely slight or even sometimes missing. De Takats[1] stated that in all of his five reported cases the injury was mild and insignificant. "Severe trauma causing fracture of long bones and total transsection of nerves, does not seem to be followed by this syndrome." (De Takats[2,9,10]). Evans[11] could find somatic injury only in 50% of his 32 studied cases. Of Livingston's[12,13] 10 reported cases of "Post-traumatic Pain Syndromes," five patient (50%) did not have any somatic injury at all.

To these cases with no somatic trauma in the history, the theory of Braeucker,[4] de Takats[1] and Livingston,[12] assuming a chronic stimulation of the peripheral and central nervous system and of the sympathetic system, caused by a chronic focus of irritation, or the theory of the establishment of an internuncial pool which produces a chain of pathological reflexes inside the spinal and sympathetic pathways, cannot be applied.

Before speculations about the pathogenesis of these cases are made, I will report a unique case of traumatic edema which I had the opportunity to observe for several years and to obtain an autopsy report (Orbach[14,15]):

A 44 year old man suffered a fracture of the left caput humeri on July 13, 1924. After six weeks his condition, according to his account, so improved that he could resume work. This accident happened at home and therefore was not compensable. After he had worked for several weeks, he slipped on October 2, 1924, and fell with his left shoulder against a pipe. Since this accident happened at the place of employment, a compensation claim was instituted.

An x-ray picture was not made after the second accident. According to the history, the physician did not think it was necessary, assuming that there was only a slight contusion present. The patient however "felt" that the second trauma "loosened" the old fracture and that this became still worse by a sudden forceful motility test of his left shoulder by the examining physician. The patient did not stop working immediately in order not to lose his position. After 11 days however he had to give up work owing to the pain and weakness in his left arm.

In the course of the following months, the arm became paralyzed and an enormous swelling of the hand developed. Wearing a mitella improved the edema but caused a painful swelling of his left shoulder. The patient was seen by me for the first time on April 2, 1930.

Findings: Patient is an obese and pasty looking man. Abdominal and chest organs normal. Blood pressure 200-120. Urine—albumin negative, sugar one plus. Serology negative. Eyes showed strabismus concomitans convergens. Slight exophthalmus. Neck revealed a slight diffuse struma. No tachycardia present. Flaccid monoplegia of the left arm is present.

There is free passive motility in all joints of the left upper extremity with the exception of a slight decrease of the excursions in the left shoulder joint. Active movements are impossible with the exception of a slight active movement in the finger joints. No contractures.

There is a tremendous slightly pitting edema of the dorsum of the left hand and of the fingers. There is an increase in circumference of the left hand of 4 cm. compared with the right hand.

Atrophic smooth skin of marble appearance is present. There is atrophy of the supra- and infraspinatus muscles, the deltoid and the pectoral muscles. There are no signs of artificial strangulation or irritation. There is total analgesia and tactile and thermal anesthesia of the whole left upper extremity, sharply terminating at the arm-trunk junction. There is no disturbance of depth sensibility. Normal faradic and galvanic irritability are present. The triceps reflex is positive and equal upon both sides. The radial reflex is not obtainable bilaterally.

There is tenderness at the site of the left brachial plexus upon deep palpation. The corneal reflexes are decreased. The pharyngeal reflex is not obtainable. There are no enlarged lymph glands in the region of the supra- and infraclavicular fossae and of the left axillae.

An x-ray picture taken on April 2, 1930, showed the following: Old impacted, healed fracture of the head of the left humerus and of the tuberculum majus. Slight arthritis deformans.

The case was dragged from court session to court session and has not come to a legal decision thus far. The condition of the patients monoplegic left arm was unchanged during the following years. He worked as a watchman in a department store. He gradually acquired the skill and the behavior of an amputee, carrying the useless left arm as an appendage.

On April 8, 1934, the patient became comatose and had to be hospitalized. His temperature was 102° F, pulse 130 per minute, and blood pressure 250-200. The urine showed albumin three plus, sugar one plus, no acetone, a microscopic examination showing erythrocytes, leucocytes and granular casts. The blood chemistry revealed blood sugar 223 mg. per cent and N.P.N. 65 mg. per cent. The patient died two days after admission.

Report of autopsy: Autopsy by Dr. E. Busch revealed the following: Atrophic pancreas. Small hemorrhage into the left temporal lobe. A 3 cm. long tear of the media and intima of the aorta associated with hemorrhage into the mediastinum. The nerve stems and the vessels of the left arm did not show any pathological changes neither macroscopically nor microscopically, but there was present high grade atrophy of the muscles and of the bones of the left arm. No pathological changes were found in the lymph vessels of the left arm.

Comment: The case of a neuropathic and stigmatized person (struma, diabetes, premature degeneration of the vascular system all being present), who developed a flaccid hysterical paralysis with enormous edema of the hand is reported. The edema was so tremendous that it cannot be considered as a vascular change due to amotility. This syndrome developed after a slight trauma of the shoulder. In contrast to it, a severe injury of the left shoulder (fracture of the humerus) from which the patient had suffered 10 weeks prior to the second accident healed without sequelae. The autopsy revealed that there were no chronic productive inflammatory processes in the axillary region and no thrombotic pathological changes of the arm vessels. The lymph system was normal. There was no organic cause detectable to explain the monoplegia or the edema of the left hand. The small hemorrhagic area in the region of the *left* temporal lobe was certainly not associated with the pathological changes in the left arm.

The second accident was extremely slight in comparison with the first one. No objective sequelae could be detected after the second accident. The physician who saw the patient directly after the second accident did not pay much at-

tention to the patient's complaints, owing most probably to the entirely negative objective findings. On the other hand, a severe psychic trauma created a compensation neurosis on the basis of a stigmatized psychopathic personality. This is without doubt a case of hysterical edema and disproves Klassen's[16] denial of the existence of such an entity. In this case, the condition became irreversible.

There are cases reported where the edema has been reversible according to the prevailing status of the patient. Raeschke[17] reported the case of a law breaker whose arm was amputated on account of post-traumatic edema of the hand. After the patient was informed that he had to start a term in jail, he developed an edema of the stump. This edema disappeared after an amnesty was granted.

There is no doubt that abnormal psychic (emotional) reactions may under certain circumstances initiate a mechanism leading to the post-traumatic syndrome. In these cases, without somatic trauma, or with a physical trauma so minimal as not to set up the "self-reexciting chain" of the "internuncial pool," a different approach to the problem has to be undertaken, as we cannot here presume a somatic peripheral stimulus as the primum movens. In the reported case as well as in others who do not show a physical but a psychic trauma, the physiopathological mechanism has to be searched for in the higher autonomic centers, probably in the synapse between the cortical neurons and the hypothalamic centers.

It is not clear what kind of disturbance there is in the synapse, whether there is a loose contact between these two axons on the basis of a constitutional inferiority of the nervous system as suspected by Zur Verth,[18] or whether endocrine influences play a role as probably was the condition in the reported case (thyroid pathology and diabetes) or whether some unknown interneuronal mechanism is disturbed.

The fact remains that strong emotions may cause organic and objectively recognizable pathological changes in the peripheral vascular bed of predisposed persons via an unbalanced autonomic nervous system.

Most, if not all patients who exhibit this interesting syndrome are either psychopaths or narcotic users; at least they show an emotional imbalance, either primary, inherent or secondary, acquired. This at least has to be admitted by Livingston[13] who denies psychopathia as a predisposing factor for the development of the post-traumatic syndrome. The reported case of post-traumatic edema associated with hysterical monoplegia shows all the symptoms of a psychopathic and endocrine disturbed personality.

JUST recently I observed another patient with post-traumatic edema of the foot and leg who in 1943 had suffered a slight contusion of his right foot which did not force him to discontinue work. Gradually he developed a painful swelling of his leg which was believed to be caused by varicosities. He underwent sympathectomy three years later which relieved the excessive perspiration of the limb but not the edema and the pain. Gradually he developed an anxiety neurosis characterized by emotional instability which necessitated electric shock therapy. Like in the first reported case, the legal claim of this patient was never closed. He refused to continue the shock therapy and his nervous and mental condition together with his post-traumatic edema remained unchanged.

A third patient who was under my care developed a slight post-traumatic edema of his left hand after a trivial injury. The edema finally subsided spontaneously after several months. This patient later was rejected from induction into military service due to psychopathia.

The incidence of psychoneurosis or emotional imbalance and post-traumatic syndrome is too frequent to be ignored. De Takats[1] gives this fact a great deal of thought. He states that the autonomic system of these patients is unstable and that one cannot help referring to animal experiments demonstrating that when cortical release is produced by decortication, an autonomic reflex is exaggerated. In the light of the present state of neurophysiological knowledge, it is extremely difficult to construct a theory about the pathophysiological mechanism taking place. Any attempt to undertake this is purely speculative and shows only the direction in which further research must be directed.

In 1934, I introduced the "liberation principle" in the mechanism of this syndrome and referred to the work of Bing[19,20] who stressed the importance of this principle in the neuropathology.

Anton[21] probably was the first person to discover this principle when in 1896 he found severe degeneration of both putamina in a case of chorea which came to autopsy. He formulated the opinion that the loss of an inhibiting influence is responsible for the liberation of automatic uncontrollable movements. Later, the theory was developed that the pallaeostriatum (globus pallidus) has to be considered as a depot of automatic motor impulses and the neostratium (nuleus candatus putamen) as an inhibiting center for the automechanism of the pallaeostriatum. Loss of the neostriatum leads to decontrol and liberation of the automatic involuntary motor phenomena of the pallaeostriatum.

The "liberation mechanism" can be observed in the sphere of the secretory nervous system. A classical example is the gustatory-lacrimal reflex as described by Bing.[20] It occurs only in cases of peripheral paralysis of the facial nerve and consists in lacrimation upon application of gustatory stimuli applied to the anterior third of the tongue which is innervated by the chorda tympani. Since this reflex is not present with the facial nerve intact, it must be suppressed by the effect of other elements of the facial nerve. During the years, the "inhibition principle" has become a basic working theory in experimental and clinical neurology.

In 1943, de Takats[21,22] adopted a similar theory, emphasizing that an abnormal sympathetic reflex caused by a chronic peripheral stimulus is more active when higher centers are inhibited. He states: "This has been shown experimentally and this may explain why reflex dystrophy occurs readily in mentally unstable and defective persons." He referred to the experiments of Grinker and Seroto[23] that with a certain amount of strong electric current "cortical dominance over the hypothalmus is lost, with resulting impulsive actions—a functional decortication."

The most important center of autonomic regulation has been found in the hypothalmus (Rioch and coworkers[24]). The cortical representation has been found by Hoff and Green[25] in 1937, as existing in the premotor cortex as well as at scattered points in the motor area and in the marginal and cingulate gyri anterior to the central sulcus in monkeys. Gellhorn[26] enumerates 11 afferent and six efferent connections between the hypothalmus and higher and surrounding centers, using an instructive diagram by Dr. Ingram of Iowa City. Besides being an important autonomic center, the hypothalamus carries out the expression of emotion. It is under the control of the cerebral cortex (Walker[27]). When released from cortical control, it is capable of giving rise to primitive emotional reactions in animals and to similar reactions in man. One might assert that expressions "of rage, temper and coarseness of behavior are hypothalamic in origin" (Alpeis[28]).

It is known that certain hemiplegias caused by organic cerebral processes show edemata of the extremities (Bing[29]). Stone[30] reported a case of hemiplegia with hemiedema due to cerebral softening. Luhan[31] found hemiedema in 15% of hemiplegias selected at random. Bucy[32] and others found and investigated vasomotor changes in hemiplegic patients.

Experimental stimulation of the cerebral hemispheres by Hoff and Green[23] has disclosed a cortical influence upon the lower autonomic centers. These investigators concluded that "there is a mechanism by which the cortex can influence the state of the cardiovascular system."

Ziegler and Osgood[22] observed bilateral edema of the feet in six out of 17 patients who had prefrontal lobotomy.

There is sufficient evidence that stimuli of the central nervous system play an essential role in the pathogenesis of certain types of edema of the extremities. As before mentioned, the predisposition to edema formation can be produced by organic cerebral processes, a theory which one may assume by the observations that cardiac and nephrotic edemata appear first upon the hemiplegic side. Raymond[35] observed a hemiplegic patient in whom the apoplectic sequelae disappeared completely. Subsequently, edema as a symptom of cardiac decompensation reappeared in the formerly hemiplegic side.

What is the explanation for the development of an edema of the extremities after total or partial loss of the cortical impulses? Firstly, one may consider the cortical stimuli exerting trophic stimuli to the tissues and assume that with the loss of motor function, the trophic impulse ceases and this may give rise to the development of a trophic disturbance.

Investigations by Asher, Kajikawa, Yamomoto, Okonoto[36] and others have shown that the central nervous system regulates the metabolism and the trophic condition of the tissues by way of motor stimulation, directly by the regulation of cellular chemistry, indirectly by the innervation of the blood and lymph vessels and by the endocrine system.

The normal trophic condition of the tissues is dependent upon normal muscular function and upon normal autonomic innervation. The correlative dependency between each of these goes even so far that the autonomic innervation is widely dependent upon a normal muscular activity. Thus for instance the muscle tonus is under the control of the autonomic nervous system which in turn is regulated by spinal impulses. The muscle tonus therefore will change when no spinal impulses are transmitted to the end organ (flaccid paralysis) or when the spinal impulses arrive at the end organ in a changed condition (spastic paralysis, decerebrated rigidity or striatum-rigidity).

A disturbance in the central nervous system is followed by one in the autonomic nervous system, as proved by trophic disturbances of the skin in cases of flaccid paralysis of the extremities (cool, cyanotic skin, trophic disturbances of the nails) on one side, and in cases of spastic paralysis (loss of hair or the contrasting condition of hirsutism) on the other side.

These and other examples prove that intimate correlations exist not only between the spinal and autonomic nervous systems but also between the numerous neurons, following the principle that phylogenetic younger neurons exert an inhibitive influence upon older neuronic systems. Loss of the first ones creates autonomatoses. Thus for instance the spastic or striatum rigidity is not primarily caused by motor stimulation but has to be considered as a liberation syndrome after the loss of inhibitive impulses of the higher systems.

Although no experimental or neurohistological proof is yet available, it is permissible to conclude that in the pathogenesis of certain cases of post-traumatic edema, the liberation of subordinated autonomic centers by the loss of impulses coming from higher regulatory centers, plays an important role. Loss of inhibiting impulses leads to incoordinated function of lower and phylogenetic older autonomic centers which when liberated fall back into an atavistic state. This liberation may be caused by organic processes as in the case of hemiplegia or following lobotomy, or may be precipitated by functional inhibition of higher centers (hysteria, psychoneuroses, heredity). The interesting experiments of Grinker and Serota[23] who produced functional elimination of the cortex over the hypothalmus by electric

current, have to be recalled in this connection.

The hereditary edema of Milroy-Meigge[37] appears in a new light as to its pathogenesis.

Post-traumatic edema in certain cases may be considered as a liberation symptom of the autonomic nervous system, as a parasympathicus-sympathicus dissassociation after loss of inhibitive impulses from higher centers.

In the reported cases, the psychogenic functional extinction of the cortical motor center brought about loss of inhibitory stimuli to the lower autonomic hypothalamic centers with the effect of liberation of vasomotor "automatoses" leading to the clinical picture of "post-traumatic edema." In this light, the value of the "individual predisposition" surmounts the value of the conventional meaning which is often used on occasions when there is a lack of factual explanations. It explains that the occurrence, duration and intensity of the liberation symptoms vary considerably depending upon constitutional and hereditary factors. Furthermore, it explains why neuropathic and psychopathic persons are affected. In stigmatized persons, the internuncial relations are apt to be disturbed more easily than in emotionally balanced individuals whose sensory threshold is higher than that of persons with labile emotions. Furthermore, the theory explains why post-traumatic edema may be produced by malingerers but then only when they are "vegetatively" stigmatized. Finally, the "liberation" theory makes plausible the development of post-traumatic edema in cases without a somatic trauma. Here the trauma is psychic (embarrassment, fright, fear, compensation complex) which in predisposed persons leads to the exclusion of higher centers ("functional decortication") and to "sympathicus" liberation with its uncontrolled autonomatoses.

As stressed by many investigators of this problem, early prophylactic psychoanalytic treatment and early legal litigation to forestall any compensation complexes, are imperative.

SUMMARY: From the pathogenetic standpoint, we have to differentiate between two types of post-traumatic edema as follows:

(a) With somatic trauma.

(b) Without somatic but with psychic trauma.

In cases with a somatic trauma or a peripheral somatic irritation, an exaggerated nutritional reflex is caused inside the sympathetic reflex chain, leading to vasomotor and trophic phenomena (Livingston and others).

In cases without somatic trauma, the same syndrome may be produced by liberation of lower phylogenetic older centers in the hypothalmus, medulla oblongata and spinalis after a functional loss of inhibiting cortical centers, on the basis of psychopathia, heredity and endocrinopathia.

The importance of early prophylactic psychotherapy and early litigation to close legal claims is stressed.

A unique case of tremendous post-traumatic edema associated with hysterical monoplegia plus two other cases are reported.

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Life and Death by the Minute

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Detroit

THE train dispatcher motioned me to a chair at his work table, handed me a train phone like his own, pointed to a jack where I might plug into his open line. For the next half hour I was a pseudo-train dispatcher. My only other equipment was a stop watch, pencil and pad. During that half hour, (this was one of many such "sittings in") the real train dispatcher received 91 train calls, initiated 68 messages, and in his spare time issued one complex train order. Every one of these 160 items (5.3 per minute) contained decisions involving life or death for all passengers on crowded trains, train crews, to say nothing about such trivia as property. At the end of 30 minutes I wanted to stand up and shriek, "No human mind can carry such a load without going berserk." I didn't yell. That would have disturbed the tense-faced train dispatcher; besides he was proving my judgment as a physician fully wrong. He was doing what the human mind is not rated to do,—not for just one half hour, but for 16 half hours daily, six days a week, month in and out. Nor was he berserk,—well, maybe a little berserk, but then it was only 10:00 o'clock in the morning.

Who Is the Train Dispatcher?

WHO is this gentleman, the train dispatcher? He may be far removed from the trains he operates. He gets no cinders in his eyes and smells no train smoke. He may sit in an easy chair before a glass-covered table on the twelfth floor of an air-conditioned building. Sounds like a railroad gravy wagon. By the uninitiated, it might be said, "Here we have a clerk." That's because he is uninitiated. The train dispatcher carries a greater minute-by-minute mental load than that for any known occupation save a general in battle. Generals don't fight daily battles for 20 years. Train dispatchers do. I can't say "for 40 years." Train dispatchers don't live to work that long.

The locomotive engineer runs one train. He looks only for the next oncoming semaphore. He listens only for the next track torpedo. The train dispatcher pulls the throttle on 20 trains, maybe 50. From every station the dispatcher gets a report on every passing train—north or south, east or west—passing train, freight train, work train. It is the dispatcher who directs the locomotive engineer. He issues all train orders. Sometimes on busy divisions, for a division is the customary territorial limit of the dispatcher's domain, traffic may be so high that vital judgments must be exercised at the rate of 200 per hour.

Not only does the dispatcher make these decisions, he also writes them down—but not always. That gets over onto the train sheet, but that evil document must bide its time for a few paragraphs.

This man with a thousand minds is saddled with a lot of onerous added functions that seemingly almost any one else might perform. He is a timekeeper. By law, when a train crew has been on duty 16 hours, the dispatcher must run the train onto the nearest siding and put the crew to bed. It is not recorded that he must find lodgings. The law does not specify the dispatcher. It merely specifies "no more train running." He is a humane officer. If a car load or a train load of livestock journeys about, the dispatcher must stop the train at appropriate intervals to provide his dumb friends with a drink. Again that's the law. It might appear that the train conductor might acquire that responsibility. Not so. You see the dispatcher knows just where all the good watering-places are. He is a mensurator. When a heavy freight load requires a giant locomotive, the omnipotent dispatcher must pass on clearance. He must know the dimensions of every tunnel, cut and bridge. This goes as well for every oversize shipment, steam shovels, drag lines, cannons, boats. After all this, the dispatcher becomes the train crew messenger. Along about 4:00 in the afternoon, at about the time the 200th official message has beaten into his ear, some small town station agent phones in: "The brakeman on Number 47 that you have run on the siding here wants you to phone Honeysuckle 8972-J and tell his amoret that you have him pinned down here and he can't keep his dinner date and not to put on those ham hocks and cabbage." All that and more on a common day.

Now add just one wreck—even a little one—a derailment or a broken rail—and the whole chess board pattern of train movements blows up. During a single 24-hour period just prior to a Labor Day holiday, on a single division, 756 trains (including light locomotives) have been dispatched—an even 252 trains for each of the three eight-hour-trick dispatchers—an average of 31 new trains every hour—but not neglecting all the old ones.

Most dispatching is done with open circuit telephones with loud-speakers or ear phones; some with telegraphy; some with automatic centralized traffic control. Telephonic communication is most subject to disruption. On one single division of 150 miles, there are 256 points along the route where anyone with a phone set may plug in. Imagine the dispatcher, grimly going about the business of issuing a formal train order for a transcontinental flyer, being interrupted by a half dozen interlopers—a section crew boss asking for an extra keg of spikes for tomorrow or the motor car operator wanting to

know when he is to pick up the repair gang. Of course the autocratic dispatcher may bark all and sundry off his lines, but the harm already has been done—mental confusion.

A railroad train has no private life. All is known to its dispatcher. And more, that infallible one must know the quirks and capacities of every engineer. He salads his train movement strategy with the knowledge that old "High Ball Smith" can take the worst engine in the district and drive it up grade pulling 92 loaded cars and arrive as scheduled, while "Flat Head Jones" can't drive the best locomotive on the line down grade for 30 miles without getting into trouble.

Still want to call the train dispatcher "only a clerk"?

All 4330 of them?

How Long Has This Been Going On?

THE beginning of train dispatching is fairly well recorded. Prior to 1851, the few opposing trains moving on single tracks without time tables and Morse telegraphy were controlled by setting a post along the track beyond which a train might not move until its opposing train arrived, whereupon the latter was required to back up to the nearest side track for passing. About that year an official of a New England railroad was impatiently waiting at a station with its post for a delayed opposing train. Morse wires were at hand. This petulant official wired the conductor and engineer of the delayed train to wait where they were until his train arrived. Traditionally that was the first train order and the sperm of train dispatching.

Nowadays high railroad officials do not issue train movement orders. The dispatcher is czar. Even the railroad president has at times this one boss, but it may be suspected that any train bearing its president may be given some preferences. In its adolescent years train dispatching was a sinecure.

Nightmares By Day

IN THE demonology of train dispatching, the arch devil is the wrecker. When a bookkeeper makes an error, he merely uses the eraser at the other end of his pencil. When a dispatcher makes an error, he calls out the $150,000 wrecker and the wrecking crew. Of course that ugly term, under the aegis of railroad psychologists, has been buttered down to the less alarming "relief train." That's the term in the public relations book, but in the mind of the dispatcher it's the same old "wrecker." That menacing symbol of disaster woggles its sinister crane neck and gnashes its heavy machinery at the dispatcher and dares him to make a single error. The dispatcher must make no errors.

The career-long question of every dispatcher —the source of his anxiety—the cause of his night and day uneasiness—is "When do I have my wreck?" No dispatcher ever will admit any anxiety over causing a wreck. It is always the other fellow who is anxious. That's just part of his inhibitory negativism. His subconscious knows and the subconscious is honest.

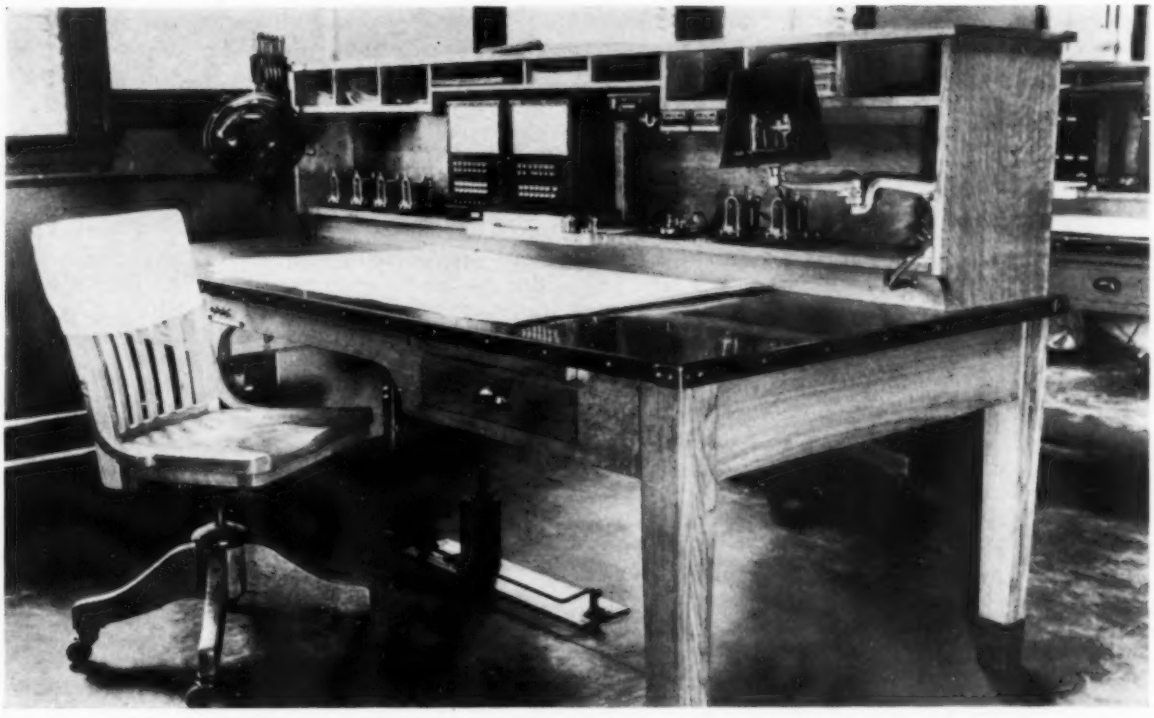
A jury weighing life and death for a murderer may take 36 hours to reach its decision. A train dispatcher with 500 passengers on a single train may have only 20 seconds at his disposal. He does not see spots before his eyes, he sees piled up passenger cars. This squeezing of the brain to unerring accuracy does queer things to his mind and body. Every train dispatcher is a neurotic. This term is not used with opprobrium; a neurotic is merely a person shut off from almost everyone through anxiety. He is a bigamist, wedded with his ears to his train phone or loud speaker, and with his right hand to his train sheet.

Train Dispatchers Don't Live Long

A LIFETIME friendship with a train dispatcher may be a short affair—about 15 years. The historic disturbing example of short lives in a trade is that of the buhrstone maker. Generations ago, and long before the day of the synthetic grinding wheel, natural gannister stone was carved into wanted shapes by workmen who started in near the age of 20 and were on the average dead at 35 from silicosis. Few are aware that the train dispatcher who starts his duties at 35, after years of preparation as a telegrapher or tower operator, parts company with this troubled globe near the age of 50.1 years. Statistically that statement may not be sound. There are not enough train dispatchers and enough deaths among them to provide adequate mortality figures. It is no less factual that the average age at death for 440 train dispatchers, the highest total acquirable from their benefit association records at the time of the investigation, was 50.1.

At the age of 30, and for the period of this investigation, life expectancy for all males was for an additional 35.94 years—that is, a total life length of 65.94 years. When the average age at death for train dispatchers is only 50.1 years, the difference of 15.84 reflects tremendous life waste. Although few train dispatchers enter that profession when younger than 30 years, it has been established that only about 22% are 55 years or older. It is a commonplace vital statistical concept that the ratio of deaths between the decades 40-49 years and 60-69 years is 1: 6.3. In the case of train dispatchers, this ratio (from meagre statistical material) is 1: 1.9. Thus it appears from this, and all other evidence, that the train dispatcher's diseases come early. Premature heart disease is the greatest single factor in establishing the average age at death of train dispatchers at 50.1.

It is not necessary to walk right up to the grave in appraising the physical lot of train dispatchers. Retirement and annuities for the country's 1,543,588 railroad workers are controlled by the Federal Railroad Retirement Board. This official group, in reporting the percentage of disability annuities in relation to the total annuities, recorded that the train dispatcher stands at the



Train Dispatchers' office of the Western Pacific Railroad at Sacramento, California, showing the equipment used by a train dispatcher, consisting of:

- Desk and chair
- Loud-speaker telephone for part of the territory
- Morse telegraph instruments for use on rest of the territory
- Two train sheets (one for each territory)
- Selector boxes at left for ringing reporting stations along line (One button-pushed creates impulses, a combination of which causes bell to ring in office desired)
- At right, a "resonator" in which is a telegraph "sounder." The resonator acts to increase sound of the instrument so it can better be distinguished from the other five sounders.
- To left of the first two sounders is the telegraph "key"
- At left (below desk top) is outlet for plugging in phone transmitter
- Below desk is foot-pedal to "cut in" the dispatcher when he talks to men out on line

top of the column of frequency of disability before normal retirement age. The lowest frequency of disability annuities falls to the lot of workers in the "stores" division. Road engine men, who might be expected to furnish high numbers of disabilities prior to normal retirement age, fall well below train dispatchers.

In this dismaying situation, it may be pertinent to inquire, "Why has public health attention not been attracted to this devastation?" The answer is simple. Biologically, the train dispatcher has never been discovered. For many purposes, such as insurance compilations, the small number of train dispatchers (about 4330) has been lumped in with that much larger group of 225,135, making up the total professional, clerical, and general category. A fair percentage of all train dispatchers might die in a single year and scarcely produce a ripple in the total curve.

The Dispatchers' Psychosomatic Affairs

HOW SOON after the birth of train dispatching this work provoked fatigue leading to measureable bodily and mental defection is not known. From the beginning, any psychograph of train dispatching would probably have revealed peaks in the requirements for such faculties as planfulness, the management of discrete units associated in time, attention distribution, immediate adjustment to new problems, muscular coordination, and resistance to fatigue. Multiplication of these exactions through many ramifications in time jolted the dispatcher into a different being.

During the early decades of the century, the dispatcher vaguely and gropingly sensed that something was wrong. Of course, he is subject to all the ills of his male neighbors. He may acquire pneumonia or appendicitis as readily as they, as possibly not more so. A few ills are characteristically occupational.

In olden days when more trains were operated through telegraphy, the train dispatcher as a medical deviate, was known for his "telegrapher's paralysis." The endless up and down motion from punching the key caused a "key hand," —a neuromuscular affection that threatened to end his days as a telegrapher. This disappeared with the advent of the "bug," an instrument that could be moved irregularly in any direction and still provide electrical contact. Few new cases followed the arrival of the "bug." Credit for that

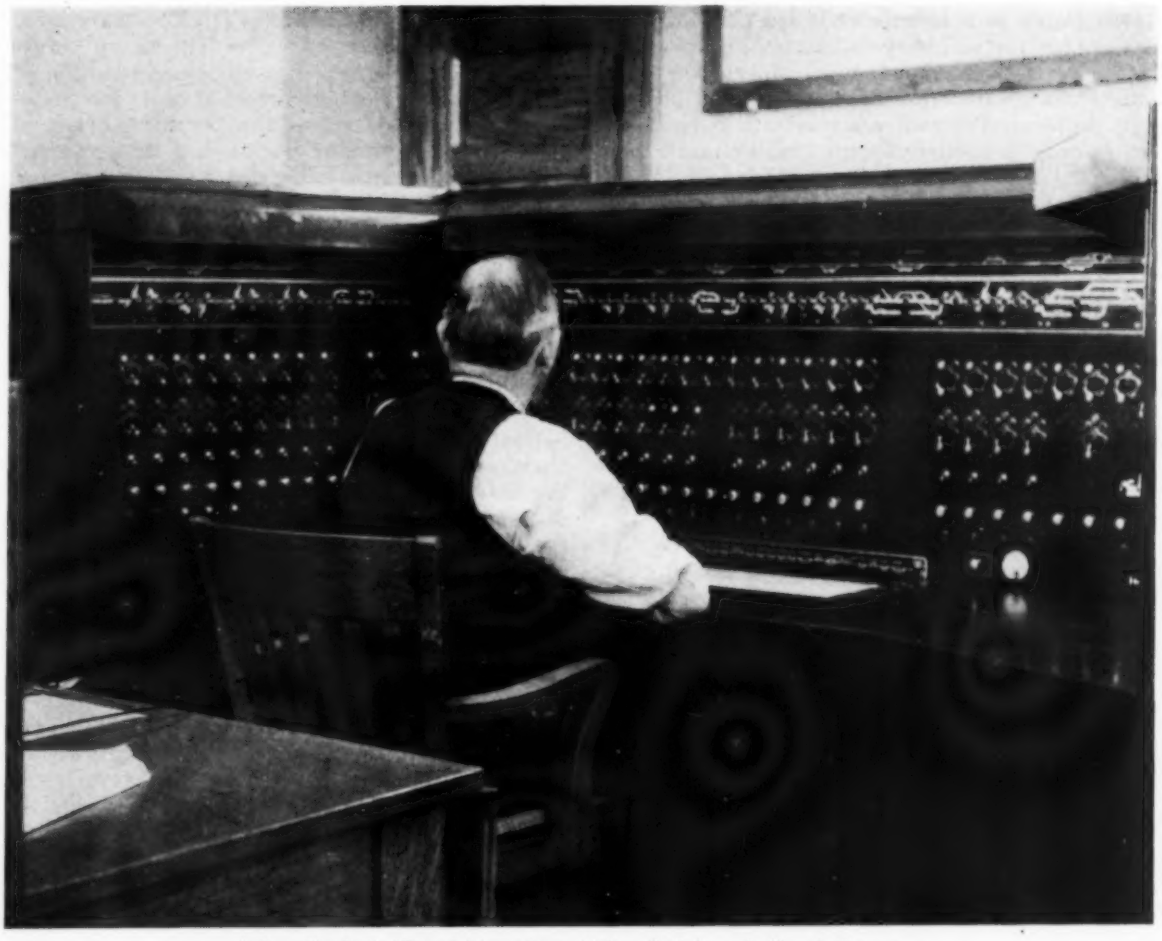
achievement falls more into the lap of the engineer than the physician. Some "old timers" rather proudly display a hampered hand and explain that "goes back to my key days." It is no stigmatizing occupational defect, but a badge of work honor.

With the advent of the big train sheet, came another occupational disease—nystagmus, "dancing eyes." In the British Isles the commonest severe occupational disease is "miner's nystagmus." This mysterious disease variously has been attributed to poor illumination, carbon monoxide, and to endless eye movements necessitated in following the back and forth movements of hand tools digging in thin mineral seams. In the United States no miner's nystagmus is known. Unexpectedly this queer disease in mild form appeared in train dispatchers overbusy with train sheets.

The train sheet is the ledger for train movements. Its size is highly varied. At one time one road's sheet is reported to have been 3 x 13 feet. A sheet 3 x 6 feet is not uncommon. This sheet is complexly ruled into hundreds or thousands of rectangles for train items. I once counted 20,000 on a single sheet in common use. A hundred spaces may be devoted to a single train. As messages come and go, the dispatcher for his records hastily moves his pen from the top to the bottom, to the left, to the right, to the middle, to the reverse—then all over again, endlessly and irregularly. Human eyes, trying to adjust to constant newness, do well but in final fatigue give up part of the fight—then dancing eyes, almost microscopic, abnormal, uncontrollable eyeball twitchings. Of 121 dispatchers carefully examined, 67 (57%) danced their eyes before us. They were unaware of it. But a few days off and the dancing usually stops.

When the dispatcher traded in his "bug" for his telephone headset, he unwittingly acquired a new threat—partial deafness. There came the time when 56.2% of dispatchers proved deficient in hearing—noise deafness or fatigue deafness. Unbelievably so, the dispatcher as an aural cripple ranked alongside the boilermaker and the drophammer forgeman. Slowly, and only in part for the conservation of hearing, came the shift to the loudspeaker. That was constructive preventive medicine. Still many "old timers" con-

Train Dispatcher's Office, Louisville & Nashville Railway, Mobile, Alabama, showing three train dispatchers and one Chief Dispatcher. Three dispatchers operate different divisions



Automatic Train Dispatching—from Union Switch and Signal Company

fess their past by a cupped hand around the left ear.

The rest is psychosomatic, more important to the dispatcher and the physician, less obvious to the public. The insulted, over-punished brain spews its rebellion to every portion of the body, demanding that all organs and systems share in the disaster. That is the essence of psychosomatic disease. The body as a whole responds to indignity to any of its parts. Poke a dispatcher anywhere and there may be found biologic disorder. The public seeks escape from the unpleasant details of Pandoral disease, but may be willing to face a single moiety. Eighty-one per cent of the men who run trains, harbor diseased hearts and blood vessels in some form and degree.

Magnificently does the dispatcher achieve safety in train movements—but at a price. To every worthwhile work accomplishment a little piece of the maker is contributed. What the tense dispatcher lavishes in warding off death by the minute for the train traveller is not a little piece of man, but the whole man.

Saving the Train Dispatcher for Tomorrow

THE old lady passenger in a taxicab, being unduly bumped by rapid driving over rough streets, inquired, "Wouldn't it be well to save this car, you might want to drive it tomorrow?"

The same gentle inquiry might be made as to train dispatchers. If long pre-training is requisite to that service, and if they are the heart of safety in train movements, would it not be well to save them for as many tomorrows as possible instead of killing them off at the unripe age of 50.1 years?

For a long while it has been the fantastic hope of occupational physiologists that some instrument might be devised to be worn about the body of all classes of workers that would add up all expenditures of mental and physical energy until at the end of the proper physiologic work period some bell would ring and say, "That's enough." This sort of Geiger-Mueller counter lies in the field of futility, since any worker performing no honest duties might quickly run up a full score from worry over the previous night's depredations or where the money is coming from to pay the next installment on his income tax.

No such instrument in the hands of the physiologist is required to determine that the busy train dispatcher exceeds physiologic limits long before an eight-hour day has been completed. In

stark frankness it is here recorded that on some divisions of the less busy railroads, the work load for the train dispatcher may be so light that monotony rather than fatigue becomes the physiologic problem. Per contra some train dispatchers are grievously burdened with greater tasks than should be imposed upon any worker. For them and them only a shortened work shift is bespoken. For some districts, a four-hour trick is physiologically excessive. It is recognized that train dispatchers may not work in relief periods, such as one hour on and one hour off. Catastrophes would be inevitable. As much as one hour might be required to brief a relief dispatcher before a relief period might begin. No escape there. A mid-period lunch apart from his desk is out of the dispatcher's world. Toilets must never be farther away than the range of the loudspeaker or else he drags his telephone equipment along with him.

The remaining earphones should give way to volume-controlled loudspeakers. The blastings of loudspeakers for eight hours may not be chamber music, but they are the choice of evils. They minimize deafness.

One of the desiderata is to eliminate the grinding train sheet. It seems simple to conceive of a "copier" operating the train sheet, as dictated by the dispatcher, but this would be as impractical as two women operating a single sewing machine. However, it would help if remaining white train sheets were replaced by "eye ease" paper,—off white tints of green or yellow. An expanse of white introduces glare and eye strain. This is an added iota of unecessary fatigue causation.

Banishment of the train sheet has been accomplished on some high traffic sub-divisions or short divisions by fully automatic train dispatching. The dispatcher sits before a panel complex with lights and buttons, a veritable miniature of the sub-division's trackage. Every siding, signal, and station has its indicator. The dispatcher pushes a button and moves a train onto a siding. A later button push releases it. The train as it travels permanently writes its trip record before the dispatcher's eyes. The universal adoption of automatic dispatching involves cost economies and other considerations far beyond the ken of an ordinary physician. But at least the unwanted train sheet is thus outmoded.

What do train dispatchers, themselves, think of automatic dispatching? "Too much eyestrain from too many bright lights." If that were all, that could be remedied.

More rather than less automatic dispatching may be expected.

The Ultimate Stake

IF THE preponderant portion of what has here been written is true (conceding actuarial handicaps), it follows that of all persons charged with the safe operations of railroad trains, the train dispatcher, regularly and continuously, shoulders the supreme load. Yet of all these procurers of safety, the train dispatcher is the one most harassed, harried, and beset as he goes about his duties. Desirable as it may be to consider and remedy the distressing plight of the train dispatcher as an oppressed human being, the ultimate scrutiny must be directed to the safety of the rail riding public and train crews. Few who ride the "cushions" in utter mental comfort, are well aware of the opportunities for wavering in the mental reed that guides their travels.

The Low Obeisance

THAT long walk from your sleeping car to the station is likely to take you by the steaming engine. Almost irresistibly comes the desire to wave an appreciative hand to the engineer—"Thanks for a safe journey." That is due and proper. A mighty man is the engineer. But your homage is only half rendered. The other hand despite Gladstone and brief case should be waved, a little indirectionally, to a mightier man—a man you may never see, the man who pulls the safety throttle on 30 or 50 trains—the train dispatcher.

GOVERNMENT itself is an agency of the people, empowered to regulate and police, but not to dominate. This is occasionally forgotten by servants of the people, who have been too long in office.

—From an Address by CHARLES W. WILSON, General Electric Company's President, at Milwaukee, September 13, 1948.

"Occupational Incapacity"

Can This Dilemma in Workmen's Compensation be Overcome?

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THIS discussion concerns an analysis of workmen's compensation in the United States. The first half is devoted to a presentation of the problems surrounding the present system, and an attempt is made to solve them. This being found impossible, the second half is given to suggestions for an alternate system. As a preview, the section headings follow:

I. DEFINITIONS
II. THE AMERICAN SYSTEM
III. JOB ANALYSIS TECHNIQUES
IV. JOB VARIATIONS
V. DISABILITY VARIATIONS
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- A. Basic Concepts
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I. Definitions

WORKMEN'S compensation is based on any one or any combination of three basic concepts. The industrially injured or diseased worker may be compensated for (1) *physical incapacity*, (2) *occupational incapacity*, and/or (3) *general incapacity for work*.

Of these three, *occupational incapacity* is a particularly confusing term. It has various meanings in different fields. It often is mistaken for physical incapacity. And more perplexing still, sometimes occupational incapacity and physical incapacity actually do mean the same thing.

1. *In personnel work*, occupational incapacity refers to a worker's inability to perform a given job for any reason whatsoever. For instance, the worker may not have the skills, experience, or physical abilities for a particular job. All factors should be considered when hiring and placing workers. If the worker fails to qualify in any respect, he may be said to be occupationally incapacitated for a specific job. (Synonymous with "occupationally incapacitated" are the terms "occupationally handicapped," "vocationally handicapped," and "industrially handicapped.")

On the other hand, *physical incapacity* refers to human physical and emotional limitations from a medical point of view. This term includes both injuries and diseases, whether physical or mental. Physical incapacity may be: (1) *temporary*, from which one recovers with no marked residual effects; or (2) *permanent*, in which case, after all medical, surgical, and natural measures have been taken, the damage continues to be restrictive. Moreover, *permanent* physical incapacity may be: (a) *partial*, like the loss of an arm; or (b) *total*, like paraplegia, complicated silicosis, or irreversible tetraethyl lead psychosis. In this discussion, we are concerned primarily with physical incapacity of a permanent nature, whether partial or total.

Since not all workers have permanent physical incapacities (or physical handicaps), it is apparent that physical incapacity in personnel work becomes but one possible consideration. But, even when it is *a consideration*, it does not follow that the worker's physical handicap will be *a reason* for occupational incapacity. His disability may or may not disqualify him for a given job.

In personnel work, therefore, occupational incapacity means failure to qualify for a specific job for *any reason*, physical incapacity being but *one possible consideration*, and, even then, only *one possible reason* for occupational incapacity.

2. Likewise, *in the field of vocational rehabilitation*, all qualifications of the disabled worker are taken into account in refitting him for a new job—his experience, aptitudes, and physical condition, to mention a few. For this reason, occupational incapacity in this field carries a similar meaning to that accepted in personnel work.

In the rehabilitation and personnel fields, however, both a similarity and a difference arise in the use of the term *physical* incapacity.

The similarity: When physical incapacity prevents a worker from entering a given occupation, it can be stated similarly that the worker's physical handicap constitutes an occupational handicap.

The difference: Physical incapacity is *a constant consideration* in rehabilitation, while but *one possible consideration* in personnel work. This is true because rehabilitation deals with *disabled workers*, while personnel considers *all workers*.

Although *a constant consideration* in rehabilitation work, physical incapacity is not necessarily a *reason* for occupational incapacity. A phys-

ical limitation, although permanent, need not prevent a disabled worker from performing the tasks of a specific job.

Hence, in the vocational rehabilitation field, occupational incapacity refers to a disabled worker's inability to perform a given job for *any reason,* physical incapacity being *a constant consideration,* but only *one possible reason* for occupational incapacity.

3. *In the field of workmen's compensation,* occupational incapacity refers to an industrially injured or diseased worker's inability to perform his former job for *the single reason of physical incapacity alone.* In judging occupational incapacity here, all of the employment factors are disregarded except the worker's physical condition. This is in decided contrast to the practice in personnel and rehabilitation work, where all of the employment factors are taken into account. The reason for this more limited usage in workmen's compensation is that the disabled workers to be compensated have already succeeded in their respective jobs, and thus possess the necessary skills and experience. When industrial injuries and diseases occur, the worker's physical status becomes the only question as to whether or not he can return to his previous occupation. *If, after recovery, his permanent disability prevents him from returning, he is occupationally incapacitated for his former job; but, if he can return, occupational incapacity is not a problem even though he remains physically handicapped.* In workmen's compensation, occupational incapacity has meaning only when synonymous with physical incapacity; that is, when the worker cannot resume his previous work because of his disability. Otherwise, when his permanent disability will allow him to return, he remains physically handicapped but not occupationally handicapped.

Summary of Definitions

IN PERSONNEL: Occupational incapacity refers to *any worker's* inability to perform *a given job* for *any reason,* physical incapacity being but *one possible consideration,* and, even then, only *one possible reason* for occupational incapacity.

2. *In Rehabilitation*: Occupational incapacity refers to *a disabled worker's* inability to perform *a given job* for *any reason,* physical incapacity being *a constant consideration,* but only *one possible reason* for occupational incapacity.

3. *In Compensation:* Occupational incapacity refers to *an industrially injured or diseased worker's* inability to perform *his former job* for *the single reason of physical incapacity alone.*

4. *In All Three Fields:* Physical incapacity constitutes occupational incapacity only when a worker's disability restricts him from a given job. Only then is physical incapacity synonymous with occupational incapacity.

With this understanding of terms, we can proceed to discuss workmen's compensation in the United States, incorporating phases of personnel and rehabilitation work when pertinent.

II. The American System

EVERY day, workmen have industrial accidents or contract occupational diseases which result in similar permanent disabilities. Yet, even with like care and convalescence, some of these workers can and some cannot resume their previous occupations. For example: Assume that both an arc welder and a machinist sustain injuries which require amputation of the left arm above the elbow. The physical demands of their respective jobs being different, perhaps it develops that the arc welder is able to continue his work with the aid of an artificial arm, while the machinist cannot go back to his job no matter how efficient his prosthesis may be.

In this case, few critics concerned with equity in workmen's compensation will deny that the machinist should receive more compensation than the arc welder. Clearly, the machinist, who must suffer the additional hardships of retraining, of obtaining new employment while stigmatized with a handicap, and of probably enduring a significant reduction in his earning power, should be compensated to a greater degree than the arc welder who escapes these difficulties. This is evident, particularly when the express object of workmen's compensation is to counterbalance the losses in earning power of industrially injured and diseased workmen.

Yet, in the United States, only California has attempted to correct the obvious injustice of compensating both of these workers alike. No other state has provisions in its *permanent disability rating schedule* to compensate for occupational incapacity. (In a small number of states, consideration of a worker's occupation is discretionary for non-scheduled disabilities; that is, for injuries or combinations of injuries which are not listed in their disability rating schedules.) Except in California, payments for all *scheduled* disabilities are made according to *the degree of physical incapacity alone* and without regard for the effect that specific disabilities have on particular occupations.

Other states have tried to claim immunity from the issue of occupational incapacity by criticizing the California method. But is this sufficient ground for these states to explain why they avoid the problem themselves and continue to condone inequity? Even if there were valid reasons why one cannot compensate for occupational incapacity, this would not prove the California schedule wrong and other schedules right. On the contrary, it would show that our very system of basing permanent disability ratings on *schedules* is delinquent.

That our American system, by and large, considers physical incapacity but ignores occupational incapacity is a matter worthy of careful consideration. In analyzing the question here, a twofold purpose develops.

1. During the first half of the discussion, an earnest effort is made to solve the problems causing current deficiencies. Step by step, the prob-

lems are analyzed in detail for the benefit of those who may wish to consider adjusting the present system. At the same time, however, the conclusions reached in this part of the discussion are disastrous for the schedule system: (a) that the American system is inherently incapable of incorporating variants for occupational incapacity; (b) that the present system is damned whether or not the attempt is made to include occupational variants; and (c) that this dilemma indicates the need for thorough research in order to develop an alternate compensation system which will eliminate the existing inequities.

2. Because of these undesired conclusions, the second half of the discussion is given to suggestions for research and for an alternate plan which might alleviate our present difficulties.

In attempting to correct the present system, how shall we approach the problem of compensating for occupational incapacity? Would not a good starting point be to consider the possibilities of listing the various disabilities which the different jobs would permit? For instance: If we analyzed jobs, perhaps we could determine the tolerance of particular jobs for specific disabilities. If this could be done, we should know whether an injured worker could return to his former job after recovery since we should know what disabilities his job would allow. In this manner, we should be able to predetermine occupational incapacity. We should be able to weight the disability ratings in our compensation schedules according to the various disabilities which different jobs would permit. This would tell us whether an injured worker should receive more or less compensation, depending upon his particular disability and occupation.

Since it appears that this approach should yield an ideal solution to our problem, is it possible to list the various permanent disabilities which different jobs will tolerate? What will be the practical, technical, and theoretical difficulties encountered? What techniques should be used? Since this would mean an investigation of jobs, how might job analysis help?

III. Job Analysis Techniques

JOB analysis is not a single technique. Depending upon the kind of job information desired, analyses are made to obtain various kinds of data. Most often the skill requirements of jobs are analyzed. Sometimes job analyses are made to calculate wage ratings. Again, jobs may be analyzed with a thought toward changing production methods, or to control hazards, or to determine only the visual requirements, as well as for other reasons.

Physical demands analysis is another part of job analysis. It singles out and records the various physical and environmental requirements of jobs for numerous factors such as lifting, walking, sitting, and working inside or outside. The primary use of this technique has been in placement work for the purpose of matching the physical characteristics of workers and jobs.

Data on the physical demands of given jobs suggest the various disabilities the jobs will permit. For example, if a job does not require hearing and talking, it is likely that it could be performed by a deaf-mute. Hence, if we could establish that arc welders need but one good and one artificial arm, that brick layers need but two good fingers and thumb on each hand, and that janitors need no better than 20/70 vision in one eye, we could use this type of information to decide the effect that specific injuries or diseases will have on particular occupations.

It becomes clear that physical demands analysis is that part of job analysis which we want to apply in attempting to integrate variants for occupational incapacity with our permanent disability rating schedules. For this reason, it is necessary that we examine this technique closely and understand its characteristics and development.

The history of physical demands analysis in Europe and America dates back about 25 years, some of the earliest work having been done in France. Only during the last war did it achieve very extensive industrial application, and then mostly in the United States, the European efforts remaining largely academic. While its purpose of relating the physical capacities of workers to the physical demands of jobs has remained constant, the methods developed to accomplish this have varied considerably. Nevertheless, all of the schemes yet devised may be classified readily according to three approaches: (1) the general rating scale approach, (2) the disability list approach, and (3) the specific approach.

The general rating scale approach is the most widely used in placement work. For the purpose of analyzing both jobs and workers, various rating scales are applied. Some of the more familiar scales are: "arduous, moderate, light (work)"; "none, little, moderate, great (effort)"; and "constant, frequent, occasional (effort)." In simplest application, these scales are used to designate the *over-all* demands of jobs and the *over-all* capacities of workers. For example: "This is a light job." "This worker is suited for light work only." Sometimes a more complex application is made to a *series* of activities: "This job requires little lifting, and moderate standing and walking." "This worker can do light lifting, moderate walking, but no climbing." With such designations, presumably the worker and job can be matched.

A criticism of the rating scale approach *as a placement device* would call for several complex, technical arguments. Let it suffice here to mention that the general terms used in rating scales ("arduous, moderate, light") are subjective and nebulous, with no valid criteria established to judge their meaning. To conclude, however, that this approach would be valueless *in compensation work*, it is only necessary to point out that we should be left in doubt what disabilities a given job would tolerate. To determine, for example, that a job is "moderate," tells us nothing of the

allowances the job would make for specific disabilities. Or again, even to know that a job requires "light lifting, moderate walking, occasional sitting, and no climbing," gives us inconclusive data from which to make occupational disability determinations for compensation schedules. Regardless of the merits or faults that rating scales may have in placement work, clearly this approach can be discarded from present consideration.

In the second of these three methods, the disability list approach, application is made by analyzing jobs with a list of disabilities in mind. A job is observed, and, in the opinion of the analyst or group of analysts (which often includes a physician), *a list of disabilities* is checked "Yes" or "No," depending upon whether the job will allow the worker to have such disabilities and still perform the job successfully. Sometimes, when an alternate phase of this method is used, the analysis is made by checking *a list of activities* which the job requires and then determining the kinds of disabilities the job will permit by reanalyzing the required activities. The goal in either case is, of course, the construction of a list of the permissible disabilities for each job analyzed. It is contended that, as a placement guide, these lists make it possible to place physically handicapped workers on those jobs which have been listed as suitable for workers with their respective disabilities.

If this assertion is true, this method is ideal for compensation purposes. Knowing what disabilities given jobs would tolerate, we know whether a worker with a particular injury or disease can return to his work after recovery, and thus we can pay him more or less compensation accordingly. But is this method without shortcomings?

Even though the U. S. Civil Service Commission used this method in the largest physical demands study ever made, this technique is unsound fundamentally. The origin of the disability list approach can be traced in both Europe and America to the minds of those medical men who, being prone to grouping and classifying patients according to their diagnoses and disabilities, conceived the analogous situation of also classifying jobs into corresponding groups which would permit the services of the impaired workers in the respective disability groups. The convenience of so grouping workers and jobs on the basis of disabilities was emphasized.

In the desire for simplicity, however, even elementary principles were neglected. First, in compiling disability lists for jobs, regard is not shown for the extensive variation to be found in the physical and environmental demands of jobs. Second, what is even more amazing (since this scheme was conceived by medical men and the individual nature of the ill and injured is a first principle in medicine), the classification of physically handicapped workers into various disability groups assumes that the capacities of the disabled in any given group are similar, and thus ignores the wide variety of adaptability and competence to be found among the disabled in any specific group.

As opposed to *grouping* either workers or jobs on the basis of disabilities, the highly *individual* nature of both may be realized by recognizing the multiple facors involved. For example: If we analyzed the extent to which walking is required by jobs, the range would extend from zero to the full length of the work period. Likewise, if we rated all workers on their capacity for walking, the range would extend from those who could not walk at all to those who could walk all day. We should find this complete range in the physical demands of jobs and in the physical capacities of workers for each of the many physical and environmental factors required by jobs, such as: carrying, crouching, hearing. handling, and working in noisy surroundings, in wet quarters, and on high places. *For each of approximately 80 factors such as these, both the demands of jobs and the capacities of workers would cover a range from 0 to 100%.* Whether the frequency distribution curve for each factor would follow the contour of the normal frequency curve is unimportant. The complete range of 0 to 100% in *each* of the 80 factors for *both* jobs and workers is more than sufficient to indicate that each job's demands and each worker's capacities should be considered as forming an individual pattern. The individual nature of workers and jobs being primary, the fragility of concepts that try to fuse them into amalgamative groups becomes apparent.

In the development of the third method, the specific approach, the disadvantages of the two previous systems were recognized. First, the nebulous terms used in general rating scales were abandoned and in their stead specific facts were adopted. For example, rather than rating, a certain lifting operation as "moderate," the objective fact would be recorded, such as: "This job requires lifting up to 50 pounds intermittently for a total of one hour per shift." Second, instead of dealing with groups as in the disability list method, emphasis was focused on the individual nature of both the worker and the job. Furthermore, in developing the specific approach, stress was laid upon the importance of the physical *abilities* of workers and what they *can do* rather than upon the negative aspects of their *dis*abilities. In brief, as opposed to both rating scales and disability lists, the specific approach is a positive, individualized, and specific technique. As a tried and tested placement device, it yields factual information on given jobs and thus proves excellent for placing workers on such jobs in accordance with their individual physical capacities.

It becomes evident that physical demands analysis is valid only for specific use in the case of individual jobs and individual workers. To be reliable, physical demands data cannot be generalized; they must be specific. None of the three methods will furnish data which may be gen-

eralized and constructed into a reliable list of disabilities for a given occupation as a whole. Moreover, this is true irrespective of the purpose for which the disability lists may be intended—placement, compensation, or otherwise.

In the two following sections, more complete reasons are given (1) why it is technically unsound to attempt to construct disability lists for jobs, and (2) why it is false judgment to assume (a) that the capacities of the impaired workers in any given disability group are similar, and (b) that physically handicapped workers can occupy jobs which have been listed as suitable for their respective disabilities.

IV. Job Variations

THE *variations to be found in the physical and environmental requirements of a given job as it exists throughout industry make it impracticable to attempt to analyze all of its dissimilarities. Even if a single job were thoroughly analyzed in all industries, the diversity of its physical demands makes it technically impossible to determine the disabilities the job as a whole will tolerate. Furthermore, jobs are not static and their demands are constantly changing, thus nullifying fixed conclusions about them.*

To illustrate this major point, let us assume that we wish to obtain information on the physical and environmental demands for the single job of arc welder. This job, like most jobs, is one we shall find in different industries throughout any state. (We are considering states here, since workmen's compensation is a state function.) For adequate coverage of this job, first we should have to determine the various industries in the state in which arc welders worked, and then select several firms within each industry for analysis. The field work required would be extensive and complex.

If we were analyzing the *skill* requirements for arc welders, we should find relatively slight variation in the technical knowledge, training, experience, interests, aptitudes, and proficiency that arc welders in general must possess to be successful. On the other hand, in analyzing *physical* requirements, the extensive variations to be found would multiply our task many times. Not only does the working environment vary considerably, depending upon where the job is located, but a wide variety of differences also is to be found in the weights lifted and carried, as well as in the degree of numerous other demands. This means that where *few skill schedules* are needed to analyze a given job, *many physical demands schedules* are required for the same job.

As evidence in this direction, in an analysis of the physical and environmental demands for the jobs in one shipyard (but one firm in one industry), 13 distinctly different physical demands schedules were necessary to cover the one job of arc welder (one skill schedule covering the skill requirements). In this shipyard, all of the different kinds of welders combined required 33 physical demands schedules. Moreover, all the shipfitters required 37 schedules; all the electricians, 74 schedules; and all the jobs in the shipyard, 493 schedules. Several other large studies also have shown the extensive variations to be found in the physical demands of a single job as it exists not only throughout industry as a whole, but even within one industry, and again, within one firm in one industry.

For our purposes, to cover the job of arc welder on a state-wide basis would mean preparing several physical demands schedules in each of several firms for each of several industries employing arc welders. While this task would not be impossible, to analyze all compensable jobs would be quite impracticable. Especially would this be true since, with the physical demands of jobs changing from day to day, the data would not be reliable for any considerable time.

Let us assume, however, that the data could be gathered and that they could be kept up to date. The crisis comes when we realize that such data would be worthless to us in trying to generalize what disabilities could be tolerated by a given job as a whole. This point requires careful consideration.

For each job we analyzed on a state-wide basis, we should have a number of physical demands schedules. Depending upon the job, perhaps in no case should we have less than 10 schedules and in few cases more than 100 schedules for each job. As an estimate, we might expect an average of about 50 schedules for each job; that is, 50 distinctly different patterns of physical and environmental demands for each job. But, since this is only an estimate, let us return to the 13 schedules for the arc welders in the shipyard referred to, and, even with a smaller number of schedules, make our point factually clear.

The 13 schedules for the arc welders in this shipyard show a wide range in the demands made upon these workers. Each of the 13 schedules establishes a distinct pattern of demands, and each suggests a decidedly different list of disabilities which these workers could have and still be successful. The arc welders on which the slightest demands are made are those working in the reclamation shop. Some of the permissible disabilities for the workers in this shop would be as follows:

(a) *One arm;* since the job requires but one good arm and one artificial arm.

(b) *Leg disabilities;* since the job requires walking and standing intermittently for less than one hour per day, and does not require climbing, jumping, running, crawling, kneeling, or crouching.

(c) *Back disabilities;* since the job requires stooping intermittently but 5% of the work period, and does not require crouching, kneeling, crawling, twisting, or working in a reclining position.

(d) *Shoulder disabilities;* since the job does not require reaching above shoulder height.

(e) *Loss of fingers;* since the job requires but

coarse handling and does not require fingering or feeling.

(f) *Heart condition and history of lung diseases;* since the job does not require lifting and carrying over 10 pounds about 10 feet intermittently for less than 25 minutes each day, and does not require other strenuous activities such as climbing, running, or jumping. Also, it is an inside job and on the day shift.

(g) *Deaf-mutism;* since the job does not require hearing and talking.

(h) *Impaired vision;* since the job does not require depth perception, color vision, or seeing better than $\frac{1}{8}$-inch rod tip at 12 inches.

(i) *Nervous condition;* when due to fear of high places, close quarters, or noise, since the job does not have these environmental factors.

(j) *Age and sex* would not be factors.

However, at the other end of the range in the demands made upon the arc welders in this shipyard, three of the schedules (arc welders working on the assemblies, out-fitting dock, and basins) show that the workers could have none of the above disabilities except (h). The remaining nine schedules fall in between these extreme ranges and allow for some of the disabilities mentioned.

Now then, if we had made these 13 analyses only to learn that disability (h) was the only disability that all of the arc welders in this shipyard could have in common, it hardly would have been worth the effort, particularly when, as we came to analyze arc welders in other industries, perhaps even this one common feature would be eliminated.

This limited illustration serves to indicate why we cannot construct standard lists of disabilities for arc welders in general. This one job covers almost the complete range of disabilities, that is, from virtually all disabilities to no disabilities. More dramatically stated, in one instance this job would allow the workers to be almost bedridden, while again it would require supermen.

On the other hand, while this extreme variation is not unique with arc welders and is true of many jobs, it is not true for all jobs. If we completed an analysis of all compensable jobs, we should find some jobs which *would* permit several disabilities for the job as a whole on a state-wide basis. To clarify our case, therefore, let us assume we had determined that arc welders in general could work successfully with five disabilities in common.

If we were to allow for occupational incapacity in compensation work, this would mean that any arc welder could return to work if he received injuries which caused any of these five disabilities; but, with injuries resulting in disabilities other than these five, he could not return to work and therefore would receive greater compensation. The loss of an arm would not be one of the five disabilities which all arc welders could have in common. Hence, if an arc welder lost an arm, he would receive greater compensation. Yet, while not all arc welding jobs permit the use of an artificial arm, numerous arc welding jobs do allow for this disability. Thus, while we should have paid more in that we had judged the man could not return to work with one arm, the probability would be that he could return to work as an arc welder. Where, then, would equity lie?

Such errors in judgment would be frequent. The case of the one-armed arc welder is, of course, only an example. To be sure, less vivid and more common disabilities would result in similar inequities. The errors, however, could not be attributed to physical demands analysis since it proves the fact that the widest possible diversities do exist in the demands of even a single job. *This fault would lie in our attempting to generalize data with extreme ranges.* This point is the very key to our difficulties. Because a given job will permit one-armed workers in some instances while requiring two-armed workers in other situations, it is clear that we cannot say that the job in general requires $1\frac{1}{2}$ arms.

Possibly to our sorrow, first we learn that to generalize physical demands data is impossible for the many jobs which cover a range from no disabilities to all disabilities, and then, to cap the climax, we learn that even when it is possible to form some generalizations, we are unable to achieve the balanced justice we desired in trying to compensate for occupational incapacity.

So far, the case has been presented from the standpoint of one trying to construct standard lists of disabilities for a job as a unit. Since this has been shown to be impracticable, impossible, and inequitable, are there not alternatives whereby job analysis may be helpful in determining occupational variants for disabilities? Perhaps no more than two such possibilities exist. Neither merits more than brief mention.

First, if one wishes to tax the imagination, workmen's compensation schedules might be based on disability lists developed for each of the numerous physical demands schedules prepared for each job; that is, from 10 to 100 disability lists would be made out for each job. While this task, like that of analyzing all compensable jobs, is not impossible, it is clear that it would be most impractical when developed and therefore needs no further elaboration.

The second possibility would be to make *no* attempt to analyze large numbers of jobs, but rather to use physical demands analysis on an individual case basis. For instance, the injured or diseased worker's specific job could be analyzed and a determination made as to whether his specific disability would allow him to return to his job after recovery. *The use of physical demands analysis would be reliable and valid.* The task of administering compensation on an individual basis, however, would be cumbersome and contribute to delay. Our present disability rating schedules are designed purposely to speed action and avoid the delay caused by trying to grant benefits on an individual case basis. Also, there is the further objection that the worker who

could qualify for return to his former job might still be occupationally handicapped for similar jobs in the same field for which the physical demands were greater. While the award would be made on the basis of occupational fitness for his specific job, the worker would nonetheless be occupationally incapacitated for his job in general.

Physical demands analysis, therefore, cannot help us establish occupational variants for disabilities to be combined with our disability rating schedules. It is probable that attempts to use it for this purpose will result in hindering rather than promoting justice.

On the other hand, physical demands analysis remains unsurpassed as a placement aid in personnel work. It is evident that when a firm has physical demands information on its specific jobs, it has little difficulty in relating the individual capacities of its workers to the demands of individual jobs. Also, as has been shown in field studies, even a large firm has little difficulty in keeping abreast of its job changes, and thus it is able to keep its physical demands data current with no great effort. The value of this technique lies in the specific information contained in the individual physical demands schedules—data which are excellent for placement purposes, but which are unsuited for generalizing because they include extreme ranges.

In summary: The variations to be found in the physical and environmental demands of jobs make it impracticable to analyze all compensable jobs on a state-wide basis since each job would require between 10 and 100 schedules. To add to the impracticability of such an undertaking, the daily changes in the demands of jobs would contribute to the early obsolescence of the data. Even if the jobs could be analyzed and the data kept current, the diversity in the demands of many jobs would make it technically impossible to construct a list of disabilities which the given job as a whole could tolerate, because the range would extend from practically all disabilities to none. In those instances where the job would allow for certain disabilities on a state-wide basis, workers sustaining injuries other than those listed for their jobs would receive more compensation on the assumption that they could not return to their jobs; yet many of these workers would be able to resume their previous work in other locations where the demands were less and thus equity would not have been achieved. The valid use of physical demands analysis on an individual case basis leads to administrative complications in compensation work and thus negates its value for this purpose. By and large, physical demands analysis cannot serve the present system of workmen's compensation in the United States in establishing occupational variants for disabilities. Attempts to use it for this purpose may even prove a hindrance.

In spite of these conclusions concerning jobs, suppose we insist (as did the U. S. Civil Service Commission) that jobs can be observed and decisions can be made on the tolerance of given jobs for the various disabilities. Where would this position lead us? In the next section, the disabled worker is considered, and more complete conviction may be reached on why disability lists for occupations should neither be incorporated with compensation schedules nor used for placement purposes.

V. Disability Variations

TO DECIDE *that particular jobs will tolerate certain disabilities gives no assurance that workers with such disabilities will be able to return to these jobs after recovery. Conversely, to decide that given jobs will not allow for various disabilities does not guarantee that workers so disabled will be unable to resume their work on these jobs. The extensive variations to be found in the capacities of workers within any specific disability classification make it impossible to predetermine whether an industrially injured or diseased worker will be able to continue his former employment after recovery.*

The second major point is not so easy to illustrate as the first, since it hits at a weakness in a method of reasoning many of us use. It concerns our proneness to make classifications—our desire to group things into like categories. Often our classifications are scientific and valid; but sometimes they are made with little thought of the relation of one thing to another. Let us say that we are not always scientific thinkers in this respect, that sometimes we are superficial or "tidy" thinkers.

In believing things are alike when classified according to likeness, we are such tidy thinkers when we group physically handicapped persons according to their respective disabilities. We tend to reason that a missing arm, for example, is such a constituent of likeness that all one-armed persons can be grouped as being similar.

When we are confronted with examples of dissimilarity among one-armed persons, we immediately defend our position by admitting that we did not mean to imply that all one-armed persons actually were alike, that we were thinking of the *average* one-armed person. We state this with finality, and rarely is our defense questioned. Most likely the person to whom we are speaking has his own mental picture of an "average" one-armed man, and readily identifies it with the one-armed man to whom we have referred.

First "classifications" and then "averages"—how convenient and comforting for the tidy thinker! To some degree, all of us are guilty of such superficial reasoning; and this even though we may be aware that our subjective "averages" are fragile, based on poor samples and faulty criteria.

Moreover, in compensation work, where our present disability rating schedules make it compulsory for us to segregate injured and diseased workers according to their specific disabilities, we are constantly exposed to a situation which is

conducive to thinking in terms of disability categories. From this starting point, it is only one step to "averages," either for each disability group or for the disabled as a whole. Once this reasoning has started, how convenient it is for us to believe in "average" justice for the industrially disabled! And what is more serious, how cunningly we defend "average" justice by reasoning that, after all, there is no such thing as "absolute" justice!

It is argued that justice is a subjective term (which it is), and therefore "absolute" justice does not exist (which is true). Thus the only reality is "average" or "practical" or "substantial" justice—a fair approximation of justice. In the eyes of the law, "practical" justice has been dispensed when the full measure of the lawful standards has been met.

Of course, we need not quarrel with the jurists on what constitutes justice. It remains to be pointed out, however, that "practical" justice has meaning only when the "lawful standards" have meaning. For instance, we know that day after day the problem arises of two workers who have been hurt alike, one worker able and the other unable to go back to his former job. Under our present system, they are compensated alike. In all fairness, is this "average" or "practical" or "substantial" justice?

If we are to achieve equity, how are we to compensate for occupational incapacity? In attempting to establish variants for occupational incapacity, unfortunately our thought processes are governed by "averages." Try as we may to determine the disability tolerances of jobs, *we can think only in terms of "averages" for any disability.*

For example: How do we go about deciding whether certain jobs can be done by one-armed workers?

1. When analyzing the jobs, first we create a one-armed worker in our mind, wittingly or unwittingly. Our "one-armed worker" may be: (a) a composite of all the one-armed persons we ever knew; or (b) exceptional and capable of almost any activity; or (c) restricted and quite incapable; or (d) a strange combination of all three at once, depending upon how *we* react to a particular problem concerning *"him."* However fixed or flexible "he" may be, "he" will be *our* "average one-armed worker." (We create such "averages" for each disability classification.)

2. We hold our "average one-armed worker" in mind, and debate whether "he" could do the job being analyzed—yes, no, question mark. When there is a question mark, we think carefully and finally find "reasons" to make our decision on the basis of "sound" judgment. In doubtful cases, perhaps we pool our judgments in group discussion with our co-workers. On some occasions, a physician works with us, and, surely, we should be able to rely on his judgment concerning disabilities. Without doubt, the method of group decision delights us. We feel that not only have we improved our judgments but that we have perhaps even developed a "technique."

Actually, the delight we feel in group decision is only a feeling of relief from the responsibility of working alone with our own vacillating "averages." Odd, is it not, that we accept these group judgments readily although they are made from the same artificial "averages" as our own (physicians' judgments included)? Strange, is it not that we cling to our "averages" when *there are no established criteria for determining average persons in any disability group?*

3. Realizing the fictitiousness of "averages," suppose we brush them aside and say that we will determine the disability tolerances of jobs on a *practical* basis: We will observe jobs, and, when we find them actually being performed by disabled workers, this evidence will be our proof that a given job permits such disabilities. Where would this approach lead us?

(a) We should fail to find one-armed workers performing all jobs. But this would not mean that one-armed workers could not do all of the jobs on which we failed to find them working. At one time or another, some one-armed persons, like all the disabled, have worked, are working, or can work successfully at virtually every job in the world. That *we* do not find them working on a particular job does not mean they cannot perform that job.

(b) Conversely, when we do find disabled workers performing particular jobs, it does not follow that all workers with such disabilities (even though they may possess the skills) can work successfully at these jobs.

For these reasons, the "practical" approach is most impractical and must be abandoned. If we continue to insist that the disability tolerances of jobs can be determined, then automatically, since no other choice remains, we are forced back to our starting point and the analysis of jobs on the basis of "averages" for each disability.

How can we escape this vicious circle? To be sure, it is not an easy step from subjective "averages" to reality. In fact, the world of the tidy thinker completely falls apart. His "classifications" and "averages" vanish and he is left bewildered. He is dumfounded to learn that his elaborate classification of disabled persons is meaningless, that a disease, deformity, or disability is false justification for likening people, and that his "average" one-armed man is a myth. Possibly a new world can be reconstructed for him, provided he is willing to observe reality with considerably more caution.

The physically handicapped in any disability group are not just people with one arm, one leg, or one eye. Each is a person. Each is an individual, infinitely complex, with thousands of variable factors influencing his well-being, abilities, and behavior. While it is possible to classify people according to any one of these factors, to do so on the basis of a single factor does not allow us to conclude that people are alike in re-

spects other than this one factor. To assume that the abilities of one-armed persons are alike because they have a missing arm, obviously is quite as false as concluding that the abilities of all people six feet tall are alike because they are the same height. Those in any disability group vary as much in their abilities as any group of people who are classified according to a single factor. They should be observed individually in order to allow for a multiplicity of variables for which there are no valid criteria to determine reliable averages.

To illustrate this view, when we evaluate the capacities of disabled workers in any particular disability group, we find that the individual differences among the workers in any one group are as great for most activities as the individual variations to be found in the general population. This means that we find an extremely wide range in the abilities of the disabled workers in any one group. For instance, some one-armed workers either will not or cannot use prosthetic devices and so will have certain limitations. But other one-armed workers will be compensated by their artificial appliances and will have greater capacity for many activities than some two-armed workers. Not only do we find a great dissimilarity in the capacities of individuals in any specific disability group, we even find an overlapping with so-called normal individuals in the general population. Because of such extreme diversity, it is necessary to evaluate the capacities of disabled workers person by person, the same as other people.

This means that if we did determine the tolerance of jobs for our "average" workers in each disability group, we should have accomplished little or nothing. If we decided "yes," that a given job would allow for certain disabilities (and thus paid such disabled workers less compensation), there would be a significant number of such workers who could not return to this job (workers to whom we should have paid more). Or again, if we decided "no" (and thus paid more), there would be many who could return (and should have been paid less).

In conclusion: We find our efforts are frustrated at every step, no matter how hard we try to develop and use occupational disability lists either in compensation or placement work. First, the physical demands of jobs are so diversified that it is idle to generalize physical demands data. Second, since the dissimilarities in any given disability group are comparable to the variations in the general population, it is fruitless to judge the capacities of disabled workers by grouping them according to their disabilities. Moreover, when we try to relate "average" worker data to generalized job data, we arrive at a result which is doubly negative in character. We find that the only reliable and valid method for evaluating either the demands of jobs or the capacities of workers is according to the individual and specific approach. While the use of this method is both possible and profitable in placement work, it must be excluded from scheduled compensation operations for the reason that it is too cumbersome administratively to handle cases individually. This means that no other choice remains and that the concept of occupational incapacity cannot be integrated with our present system of workmen's compensation in America.

VI. Other Dilemmas

FOR practical, technical, and theoretical reasons, we have seen that we are unable to achieve the justice we desired in attempting to include variants for occupational incapacity in our permanent disability rating schedules. Does this mean that it must be "just the worker's hard luck" if he cannot return to his job? Surely justice must be stronger than any amount of argument against it. From what other directions can we approach this problem of occupational incapacity?

1. Our conscience chafes and perhaps suggests the bold stroke of raising all disability ratings generally in order to pay all industrially injured and diseased workers more compensation on the assumption that none can return to their former occupations. At first thought, this seems to be a satisfactory solution. This same proposition in reverse, however, means paying more to those who can go back to their jobs. This, of course, is the exact opposite of the fair balance we wish to accomplish. Either the raising or lowering of ratings for all workers alike excludes equity, and thus the possibilities of this approach as a solution to our problem vanish completely.

2. Likewise, in this same orbit of thought, either to argue or rest assured that existing compensation rates are sufficiently high to counterbalance all variations in individual cases is to ignore entirely the issue of justice. To hold that the scales are balanced when similarly disabled workers are compensated alike, regardless of the sum paid, is as transparently false in conception as to advocate that justice would prevail if, in a reverse yet analogous situation, everyone paid equal amounts of income tax. In ratio, the factors are just as unequal with disabled workers as they are with our incomes. Yet, while we continue to walk hand in hand with injustice in the compensation field, most likely we would ourselves incite a national rebellion if our income taxes were made as inequitable.

3. Since the large majority of compensable disabilities are not sufficiently severe to prevent the worker from returning to his job, it can be argued that any censorship of the schedule system for disregarding occupational incapacity is but an academic accusation better confined to the classroom. Moreover, in support of this contention, reference may be made to the advancement of safety work in reducing accident severity rates, as well as to the progress in engineering and rehabilitation practices which enhance the disabled worker's opportunities for returning to his previous employment. To be sure, these

forward steps are to be heralded. To shield this position, however, by acclaiming advances for the majority while discrediting interest in the minority is a shallow defense. Although the occupationally incapacitated workers are in the minority, it is obvious that this fact provides no ground for the defense of a system which discriminates against the very workers who need the most help.

Thus, having exhausted the possibilities of trying to integrate occupational incapacity with schedules earlier in this discussion, and now having failed to exonerate the schedule system by examining other alternatives pointing in this direction, we arrive at a critical turning point. Until now, we have been assuming consistently that the schedule system *is* fair in compensating for *physical incapacity*. Our argument has been that schedules do not and cannot compensate for occupational incapacity in addition.

But in presenting the previous arguments why individual variation in the capacities of similarly disabled workers prevents us from compensating equitably for occupational incapacity, actually we were not expounding this one point alone. What is fatally serious, we were striking at the very Achilles' heel of the schedule system itself—at its basic function of compensating for physical incapacity. By showing why the individual differences of similarly disabled workers made it impossible for us to calculate occupational incapacity, we were, at the same time, concluding with equal force that these same individual differences also make it impossible to evaluate physical incapacity according to disability categories. In evaluating either occupational or physical incapacity on the disability group basis, error results, as we have shown, from assuming that the disabled workers within a specific disability category constitute a homogeneous group. In truth, because of the wide range in individual well-being, adaptability, and behavior, any such group actually is heterogeneous in character. It becomes evident that disability rating schedules, which do not pretend (except in California) to allow for occupational incapacity, also fail to provide justice even in the single instance for which they were designed—that of compensating for physical incapacity.

Adding error to this initial failure, the basic ratings for the various scheduled disabilities are established on nothing short of "medical metaphysics." Who can say that the loss of an eye, for example, should carry a basic rating of 40%, 50% or 60%; or that it should justify an award of $2,000, $3,000, or $4,000; or that the disabled worker should draw one-third, one-half, or two-thirds of his salary for a specified period; or that the formula should be based on some combination of these ideas with the use of either fixed or elastic categories? All such calculations ignore the fact that *identical disabilities do not produce identical, or even similar, consequences for different individuals.* No matter how conveniently these various formulas may accommodate a slide rule, they are false. After all, who can put a price tag on physical injury?

Moreover, failure to compensate equitably for physical incapacity and occupational incapacity is only the beginning of the shortcomings of the schedule system. In addition, it ignores the relation of disability to such important factors as age, sex, race, mentality, education, life expectancy, and ability to compete in the labor market. Discussion on each of these could fill pages with condemning evidence. And, as if this were not enough, we could enumerate additional failures by elaborating on a long list of very real yet less tangible effects which the schedule system disregards: pain, sensory changes, cosmetic defects, deformity, edema, blurred vision, photophobia, lacrymation, headaches, dizziness, instability, fatigue, and neurosis.

To be sure, it can be argued that the present system is better than no system. Moreover, many of the awards are quite handsome. But, basically, is workmen's compensation in America to remain nothing more than a slide-rule technique for paying arbitrary sums for life and limb?

It is shame enough that the United States was one of the last nations to legislate workmen's compensation; and then, state by state, starting in 1911, with the forty-eighth state not enacting legislation until 1948. By contrast, Switzerland was first in 1881, with Germany second in 1884.

In America, the error was made in thinking that all that was necessary was to pay "something" to the injured workman. Workers were likened to machines. It was pointed out that when machines break down, the repair or replacement expenses are added to production costs. In a similar sense, when workers are injured, they are entitled to "repair," and the expenses may be added to production costs. Since the consumer pays all costs ultimately, injured workmen have every right to be compensated for industrial disabilities. We set about the construction of our arbitrary disability rating schedules for the payment of "something" to injured workmen as their "just due."

Today, because there are, statistically, relatively few complaints and appeals, the schedule system is asserted to be practical and to work satisfactorily. What is behind this claim?

1. Claims made for schemes on the basis that they "work satisfactorily" are often but defenses for their "use" alone. Because a plan is "used" it is therefore held to "work satisfactorily." Usually such claims are made without regard for a valid background from which to judge fundamental values. To realize that this is so for the schedule system, we need but recall our previous discussion.

2. More significant are the psychological reasons why workmen generally accept their compensation with little complaint.

(a) Sociologically, workmen's compensation is a new thing. Its significance is only beginning to penetrate our consciousness. Ordinarily a response of delight is expressed in receiving com-

pensation. Complaint is usually the exception.

(b) More profound is our mystic interpretation of accidents. We shelter many common fatalistic beliefs, such as: "My number was up." "I must have had it coming." "God must be punishing me for my sins." Almost everyone exhibits attitudes of either fatalism or self-blame. We tend to accept suffering as our due. In the face of our resignation to fate, naturally we are delighted when compensation falls from a clear sky (no payroll deductions). Rarely do we question the composition of the justice involved, let alone the concept of balanced justice.

(c) Failure to decry these occult beliefs is tantamount to nourishing their prolongation, as the schedule system does, either consciously or unconsciously. By so doing, our present system is able to bolster its record of few complaints, to maintain the *status quo* by pointing with pride to its "workability," and to relax with a feeling that justice prevails.

Without fail, justice is bound to prevail one day, no matter how long it takes to replace our present system. We have been long warned by the excellent work of the International Labor Office, Kessler, McBride, and others who have so expertly diagnosed the anemia of scheduled compensation. It is clear that we should strive to improve the quality of workmen's compensation in America.

VII. Does Not Equity Lie in This Direction?

AS WE have seen, the schedule system of compensation blocks justice at every turn. Failing in its primary function of providing fair compensation for physical incapacity, it then faces frustration forever thereafter, no matter in what direction it tries to escape from failure. Not only do the vital elements of physical and occupational incapacity block its path, but a host of other dilemmas makes it conclusive beyond dispute that the schedule system is inherently incapable of ever dispensing other than arbitrary justice.

And what is the answer? Admittedly, there is none—none, that is, which is complete and polished and can be handed out as a blueprint with success guaranteed. But this does not mean there never can be an answer. To get the blueprint means research. Let us hope, however, that not again will we make just a long, scholarly investigation of the plans of every state and nation, a bookish study which is sometimes called research.

This time, let us apply the principles of scientific method to our research and undertake significant field studies.

Already the direction of the research and many of the goals to be achieved are clear. Furthermore, the philosophic foundation on which our system should be built is no longer speculative. Not as a final blueprint, but rather as an outline of the philosophy and the research needed to construct our plan, the following points are suggested.

A. Basic Concepts

1 ABILITIES VERSUS DISABILITIES: Underlying the principles of workmen's compensation is the intent to counterbalance the losses in earning power of industrially injured and diseased workers. While this will be discussed from other angles later, the point at hand is this: Under the schedule system, always is the attempt made to compensate the worker on the basis of his *disability*. This negative approach immediately stands us on our heads and keeps us forever spinning. In essence, this is true because:

(1) *Disability Alone:* When we try to compensate for physical incapacity alone, we ignore the relation of the disability to an almost endless chain of factors, such as occupation, age, sex, race, and ability to compete. That these factors cannot be integrated with permanent disability rating schedules has been shown.

(2) *Same Disability:* Even if we discount the above factors, still, when we put a "price" on specific disabilities, we stand blinded to the fact that the same disability does not mean the same thing to different persons.

(3) *Different Disabilities:* By degrees, we judge that the loss of a hand is of greater consequence than the loss of a finger, that an arm is more important than a hand, and so on up the scale, paying more as we go. Here again, we turn our backs upon the reality that a major loss to one worker may have but slight effect on his occupation and general well-being, while a minor injury to another worker may produce disastrous results.

For these three reasons, no matter how patiently or cleverly we try to compensate workmen on the basis of their disabilities, we are confronted with perplexing and insoluble situations.

Fortunately, we need not continue to spin on our heads and remain entwined with this negative philosophy of disabilities. It is not impossible, or even difficult, to relieve our dizziness and stand erect with clear thoughts. Here is the idea:

Injury, by and of itself, is strictly a medical problem, one confronting the doctor treating the injury. Medicine does everything in its power to treat the injury and to restore function, natural appearance, and normal behavior. But, except to medicine, injury—alone and by itself—is meaningless. Clearly, it is not the injury but rather the effects of the injury that have meaning for the victim. Whether it is a finger lost, or a hand, or an arm, is not the problem at all. The real problem is this: *What effect does the injury, regardless of its medical scope, have on the person hurt?* The important thing is how his remaining abilities will allow him to adjust to life—personally, domestically, occupationally, economically, and socially. It becomes evident that what we really have been searching for all along is a method to evaluate physical *capacity*, not *in*capacity—physical *ability* not *dis*ability.

This refreshing concept of positive abilities

(as opposed to negative disabilities) casts a distinctive light on the underlying principles of workmen's compensation. No longer shall we be holding our dizzy heads, trying to calculate the exact nature of the disability, and knowing all the time that such calculations ignore a thousand issues in the real life of the worker. We shall rather be concerned with comparison of the worker's pre-injury and post-injury abilities, with how his remaining capacities will allow him to adjust to his individual life situation.

How abilities are to be evaluated, how this concept will eliminate the need of disability schedules, and how the worker will be compensated automatically for physical incapacity, occupational incapacity, and general incapacity for work will be discussed under B. INTEGRATION.

2 HUMAN BEINGS VERSUS MACHINES: In the early development of workmen's compensation, workers were (as we said before) likened to machines. Although this comparison helped to argue the enactment of compensation legislation, it fitted smoothly, nevertheless, into the man-machine philosophy of the industrial revolution, a philosophy responsible even yet for many industrial ills. Likened to machines, workers were credited with scarcely more life than machines. They were eight-hour mechanisms, not human beings. Mechanics were emphasized, humanics ignored.

Today, the obsoleteness of the inhuman man-machine philosophy is well recognized by most progressive industrialists. When workers are treated humanly, production rates and morale increase, turnover and absenteeism decrease. Both employer and worker benefit.

But workmen's compensation has not kept pace with modern industry. It remains enmeshed with the old man-machine philosophy. When compensation is paid in its present form, it is much like paying the repair or replacement bills on machines. Even on going back to the original purpose of compensation and the idea that it is to counterbalance the losses in earning power of injured workers, no one can deny that payment for payment's sake neglects the human element. Just to pay "something," to "buy the worker off," so to speak, and to disregard the effects of his injury on his general well-being is as heartless as buying a new machine.

In our plans, we must not fail to allow for the fact that workers are 24-hour-a-day human beings, not eight-hour mechanisms. We must consider the effects of the worker's injury or disease on all aspects of his complete life.

3 INDIVIDUALS VERSUS GROUPS: Since the importance of the individual person has been stressed time and again throughout this discussion, it should be evident that this subject merits a major heading in our plans. This once understood, we need not recount here our many arguments supporting the individual over group concepts. On the other hand, one fresh consideration calls for emphasis. By dealing with abilities rather than disabilities, we can discard all former concepts of *disability groups*. In the development of our plans, we shall consider the effects of injury and disease on the *abilities* of the *individual* worker as a *24-hour-a-day human being*.

4 REHABILITATION VERSUS DEHABILITATION: Dehabilitation may be a new word. Or is it so obsolete that not even Webster wants it? At any rate, it is used here to express the opposite of rehabilitation, in order to crystallize what happens to many industrially injured and diseased workers under our present system of workmen's compensation.

As we have noted, the various disabilities are first "priced" according to severity. Next, these arbitrary rates are paid—say $5,000 for the loss of an arm (a conservative figure). Sometimes this sum is paid all at once. This method delights the worker in the beginning; but, more often than not, lump-sum payments are soon squandered. Generally the $5,000 is paid by weekly check over a period of several years—say at $25 a week. This method is supposed to relieve economic tension while the man is getting *re*habilitated. In many cases, however, the man takes it easy, realizing he has several years ahead of him in which to think about work, and, actually, becomes *de*habilitated. Little concern is shown, since the man has been paid his "just due." Slowly, the man-machine philosophy grinds another life to dust.

To argue that our present system encourages rehabilitation is idle. While it may be the intent, it is not the fact, because: How explain the numerous cases of dehabilitation? With slight exception, there is, throughout the United States, a tremendous gap between workmen's compensation and vocational rehabilitation. In our plans, we must attempt to close this gap, to dovetail the two and return the man to work as soon as possible, both for his good and society's. It is shortsightedness, if not social negligence, to have workers become dehabilitated when they can be rehabilitated. By counteracting the man-machine philosophy (the idea that all is well when the man has been paid his "just due") with an understanding of the human element (the idea that both the man and society benefit by considering the man's general well-being), the gap between compensation and rehabilitation can be closed to the advantage of all concerned.

B. Integration

THE ideal in workmen's compensation would be for us to be able to prevent all industrial accidents and diseases and thus eliminate the need of workmen's compensation altogether. This ideal motivates the work of safety and industrial engineers, hygienists and sanitation engineers, personnel and medical officers, management and labor, and educators and research men. That this ideal is not achieved does not negate it in the least. Every day we work toward this goal even

though we may never be able to attain it.

Since, try as we may, we are unable to prevent all industrial accidents and disease, our secondary ideal should be to eliminate all their harmful effects. We should, with all the forces at our command, make up for all of the differences between the man's pre-injury and post-injury life. This, and nothing short of this, should be our goal in workmen's compensation.

Granting that accident prevention is the first step, we are now in a position to ask what steps should be taken to bring us closer to our goal. The following three suggestions are made, but they are not listed in order of importance since all three would be realized simultaneously: (1) Rehabilitation, (2) Compensation for Earnings and (3) Compensation for Personal Loss.

1 REHABILITATION: Rehabilitation may be divided into (1) physical-emotional rehabilitation, and (2) vocational rehabilitation. The first brings into play all of the arts known to medical science, while the second adds all of the skills under industrial psychology (such as interviewing, counseling, testing, job analysis, training, placement, follow-up, and evaluation).

Physical rehabilitation starts at the time the worker is hurt or is known to have contracted an occupational disease. Everything is done by the physician, surgeon, and psychiatrist to restore the worker to as close to physical and emotional perfection as possible. As a rule, these services are paid from compensation funds.

There should, however, be added to these medical services those of vocational rehabilitation, starting, whenever possible, right at the patient's bedside. As soon as the patient may be seen, a rehabilitation officer should be at hand to assure the man of his occupational future.

This is *not* to suggest, however, that workmen's compensation and vocational rehabilitation should be combined into one agency. Vocational rehabilitation is a broad activity and covers a much larger area than workmen's compensation covers. As now organized in America, vocational rehabilitation deals with all disabled persons 16 years of age and older and not only with the industrially injured. Its services are paid from Federal and state funds.

But it *is* being suggested that the official services of vocational rehabilitation should be both liberalized and expanded.

Liberalization: Under present regulations, a disabled person must be occupationally handicapped by his physical handicap before he can be served. But why not be able to serve the disabled person whether or not he is occupationally handicapped? This is a thought towards the concept of *preventive rehabilitation*, the idea that early vocational counseling may insure any disabled person a safer occupational future and perhaps prevent the need of elaborate rehabilitation services at a later time.

Expansion: Rehabilitation officers should be made available to fulfill the needs of at least every hospital housing industrial cases. Some day, particularly when the idea of preventive rehabilitation has gained momentum, perhaps these services will become as much routine for all permanently injured persons in every hospital as the services of medical personnel. It is believed that a surprisingly small staff increase would allow for the coverage of industrial cases in hospitals.

Furthermore, the need to expand vocational services does not apply to government agencies alone, but well may be considered by private groups, that is, by hospitals disposed to add vocational counselors to their staffs.

For vocational rehabilitation to start as soon after injury as possible and for it to include preventive rehabilitation—both are important. For the patient, this step will help relieve excessive worry and psychological deterioration. Early counseling, with the giving of hope, is one of the best preventive measures against post-injury malingering. Moreover, when positive attitudes are encouraged, the patient gets well and back to work sooner, thus reducing costs.

When we see physical-and-vocational rehabilitation in action—as at the Bellevue Rehabilitation Center in New York, the Liberty Mutual Rehabilitation Center in Boston, or the Hospital for the Crippled and Disabled in Stockholm—a new world in the field of rehabilitation takes shape and points the way to the future. In these Centers, all of the skills and arts of medicine, psychology, engineering, and education are coordinated into a smoothly functioning whole, and even hopeless cripples, once given up for good, learn to work and live again.

But this does not mean that we must wait until we have such Centers everywhere, nor that we must have rehabilitation officers in every accident hospital before we can begin to work out our plans. As a start, it could be arranged to have at least one rehabilitation officer assigned to each major office of the industrial accident commission. He could screen out the reports on the most important cases and see that they were served by other rehabilitation officers working in the field. Most of the present systems of reporting industrial cases to vocational rehabilitation offices are formal and extremely slow, fulfilling the law, but forgetting the man. By at least moving to close the gap between compensation and rehabilitation with this simple step, our plans could be expanded gradually until vocational consultation became routine for all permanently injured persons in every hospital.

Earlier in this discussion, we concluded that physical demands analysis could not serve the present system of compensation. This is because the schedule system deals with disability *groups*, while physical demands analysis, to be valid, must deal with *individuals*. In our plans for the future, however, the specific approach of physical demands analysis can serve us to marked advantage. From injury to placement on old or new employment, we should be working with the in-

dividual person. We could, with little effort and expense, determine occupational incapacity for each individual case. Yet in our plans, we should not have to determine occupational incapacity for compensation purposes. That the worker would be compensated automatically for occupational incapacity, as well as for physical incapacity and general incapacity for work, may be seen in the next step, *Compensation for Earnings*. The point at hand is that the use of physical demands analysis and the determination of occupational incapacity is of particular importance in the rehabilitation of disabled workers.

By amalgamating physical and vocational rehabilitation, specific information on the physical and environmental demands of the patient's occupation could be obtained by the rehabilitation officer. These factual data could be discussed with the physician. In the light of the patient's specific job demands, the physician would be aided materially in deciding whether or not the patient's remaining capacities would allow him to resume his former employment. Moreover, these data could be of assistance in determining the kind of additional surgery that might be contemplated, type of prosthesis, kind and extent of physio- and occupational therapy, and length of convalescence.

If these job data indicated that the patient could return to his previous work after recovery, he could be assured of this fact. If there were doubt, or if vocational training for new employment were indicated, the following plans could be made:

(1) In doubtful cases, perhaps the wisest position would be to afford protection by handling them the same as the cases which needed training for new employment. If it developed later that a doubtful case could return to his old job, little would have been lost. On the other hand, if he could not return, he would have the advantage of having been equipped for new work. Either way, his "will to work" would have been sustained, and he, a doubtful case, would not have been kept in stagnant doubt as to a safe occupational future.

(2) For those who needed vocational training (including the doubtful cases), consultation with the physician would give the rehabilitation officer an idea of the patient's probable capacities for work after recovery. The man could be tested and counseled as to his aptitudes for various new occupations. In the light of his physical capacities and occupational aptitudes, plans could be made for his training at the earliest possible date, some of which might well start in the hospital. (It is reasonable to predict that the day will come when we have training shops of every kind in our accident hospitals like those they now have in Stockholm.) As the man's training progressed, opportunities for employment could be investigated by the rehabilitation officer, and the man's placement, follow-up, and evaluation carried out.

In rehabilitating injured and diseased workers, the problem of malingering is to be considered. The mention of malingering usually causes a confused argument, with as many views as there are discussants. Regardless of debate, almost all agree that a malingerer is cousin to a criminal. Moreover, to strengthen this attitude, there exists the tendency on the part of many physicians and surgeons to throw up their hands when confronted with the emotional problem of malingering.

It cannot be denied, however, that man is a physical-emotional unit. Whether malingering is prevalent among injured workmen, whether it exists prior to injury, whether it is a despicable thing, is not the question. When malingering occurs in connection with industrial injury or disease, it is as much a part of the injury as the injury itself. Those who wish, can "despise" malingering, but not rightly to a greater degree than that to which they "despise" disability. The two are related. Malingering should be treated together with the disability and receive psychiatric attention when necessary.

In suggesting the union of physical and vocational rehabilitation, consideration of the human element is foremost—the sustentation and development of the man's physical capacities and emotional drive for life and work. This can be assured through the development of rehabilitation teamwork, such teams including physicians, surgeons, psychiatrists, physio- and occupational therapists, psychologists, engineers, vocational counselors, and training instructors. Through such teamwork, physical-emotional-vocational rehabilitation can be accomplished. The man can be returned to work (old or new) at a much earlier date than at present, and to the great advantage of all concerned.

2 COMPENSATION FOR EARNINGS: Our goal in workmen's compensation is to make up for all of the differences between the disabled worker's pre-injury and post-injury life just as though no injury or disease had occurred. While our rehabilitation plans cover all aspects of the man's physical, emotional, and vocational life, what about the economic problem? Simultaneously with his rehabilitation, we should pay him from compensation funds his full pre-injury wages from the time he has to stop working until he can start again. Moreover, his specific injury or disease should have no bearing on this payment. Just as long as the man is unable to work because of his disability, regardless of what it is, he should receive compensation at his full wages until he is able to resume employment. In the event that rehabilitation cannot restore him and he is never able to work again, full-wage compensation should be paid him for life.

If we carried out this suggestion for compensating lost earnings by paying full wages, we should have few complaints against the fulfillment of our ideal in the strict economic sense. But in this economic issue, there are other matters involved; namely, the subjects of ethics and

psychology. From the ethical standpoint, there is no reason why a disabled worker should not have full-wage compensation. On the other hand, there are several possible psychologic weaknesses in this method. If compensation at full wages were paid, it is likely that: (1) the incentive for rehabilitation would be reduced; (2) tendencies toward after-injury malingering would be increased; and (3) workers on the job would disregard safety rules and be more prone to hurt themselves as well as others. For these reasons, it can be assumed that it would be unwise to compensate fully for loss of wages. We must adjust our plan to safeguard against these shortcomings.

To determine just how much of their former wages disabled workers could be compensated for without endangering their desire for rehabilitation, their will to work, and their safety consciousness on the job, is a difficult question requiring research. To our surprise, we may find that our three assumptions are completely wrong, that the best results are obtained when full wages, or even better than full wages, are compensated. We may find that all parties benefit more when all cause for economic worry is eliminated during hospitalization, convalescence, and vocational training. Still, until this is proved, let us remain skeptical and agree that less than full wages should be paid. In order to begin to carry out our plans without waiting for the research results, we must agree on an arbitrary figure. In all reasonable fairness, how could we set this figure at less than 75% of the man's pre-injury wages when it is clear that the major issue here is one of economics rather than psychology?

On this basis, *for a beginning,* the *intent* of our plan to compensate for lost earnings would be along the following lines:

(1) Each industrially injured or diseased worker should receive compensation equal to 75% of his pre-injury wages for as long as his disability prevents him from working; and this amount regardless of the nature of his disability (temporary or permanent), occupation, age, sex, race, etc. (By uniting physical and vocational rehabilitation, it is clear that this period would be minimized.)

(a) If compensation at 75% of his former wages did not equal the national minimum wage, then in no instance should he receive less than the minimum wage. The minimum wage should determine the absolute lower limit of the compensation to be paid during the period he is unable to work. His disability, occupation, or the fact that he was working only part time when disabled, should have no bearing on this minimum payment. The man is unable to work because of his disability, and this wage is thought to be the least on which a person can live. Why should less be paid?

(b) If compensation at 75% of his former wages equalled or exceeded the national minimum wage, no upper limit whatsoever should be set. He should get the full 75% of his wages during his period of occupational incapacity. Why should he be penalized more than 25% when but for our assumed psychologic reasons to create work incentives he should be compensated 100%?

(2) As soon as the disabled worker is able to work again, this payment of 75% of his pre-injury wages should stop. If he is able to return to his former occupation (as is usually the case), the following conditions should prevail:

(a) If he is able to work full time (as is usually the case), he would receive his full regular wages from his employer, thus eliminating further cause for compensation.

(b) If he is able to work only part time, and if the employer is willing to hire him for part-time work rather than have the man continue to receive compensation at 75% of his wages as under (1) above, the man would receive his regular hourly wages for his part-time work from his employer. For the hours he could not work, however, various adjustments should be made as follows:

(i) If this is a part-time situation of, say, less than one year, he should receive compensation at 75% of his hourly wages for the hours he is unable to work. As long as the part-time condition is temporary and improving there probably would be justification for penalizing the worker 25% in order to create incentive.

(ii) If this is a part-time situation of longer duration than one year, several questions may arise. Would the employer want to keep the man on a permanent part-time basis? Perhaps the man possesses valuable skills. Perhaps he can work six of the eight hours each day. Perhaps it would be to their mutual advantage for the man to stay. Should this be the case, he should receive compensation at 100% of his wages for the hours he could not work. In such cases of permanent part-time work, there remains no further justification for penalty. Moreover, if he remained on part-time work after one year, the compensation part of the 100% payment for the hours he could not work should be retroactive to the first day he returned to his job after being disabled; that is, the difference between the 75% he received during the year and the 100% to which he is now entitled should be paid from compensation funds.

(iii) Also, it is possible that permanent part-time disabled workers might have reason to consider the next point (2c).

(c) If he is able to return to his old job, but, at a later date, it can be shown that his injury prevents him from advancing in his occupation, he should be able to reopen his case and should continue to receive compensation for the full difference between his present wage and the wage he would have received had he not been disabled and had been able to advance normally. He should be compensated for the full difference here (not 75%), since in this case no cause for penalty exists. Cases of this sort would be very rare, since, with proper rehabilitation services,

the man most likely would not have been returned to his old job if it were suspected that he could not advance normally within it. Rather, he would have been trained for a new undertaking without such drawbacks.

(d) If he is able to return to his old job and to advance normally within it, but, at a later date, is released for reasons beyond his control and finds it impossible to re-enter his occupation elsewhere because of his disability, he should be able to reopen his case and receive compensation at 75% of his former earnings until he is rehabilitated and placed in a new line of work. (In such a situation, he would fall under (3) just below.)

(3) To repeat, just as soon as the disabled man is able to work again, compensation at 75% of his former wages stops. What happens when he returns to his old job has been outlined above. When, though, he cannot return to his old job but is placed on a new one, the following conditions should prevail:

(a) If his new wages are equal to, or better than, his former wages, and if, after a period of time, he appears to be doing as well as he would have done in his former job had no injury or disease occurred, he would have no grounds for further claim.

(b) If his new wages are lower than his former wages, he should have cause for claim. An arbitrary time period should be set, after which the claim could be made. Perhaps any time after two years. After two years, the man should continue to receive compensation for the full difference between these two wages. Also, payment should be retroactive to the first day of his new employment. Moreover, perhaps the man will have still further cause for claim by showing limited advancement opportunities as outlined under (2c) above.

(c) If his new wages are lower than the 75% payments he received during rehabilitation, the full difference should be paid regularly from compensation funds until the two years elapse and the man is able to claim adjustment under (3b) just above.

(4) When, in those rare cases, the disabled worker is never able to work again, he should receive compensation at 100% of his former wages for life. Here he should be compensated fully (rather than at 75%), since no penalty is needed to create incentives to return to work.

It is realized that these suggestions constitute but a skeleton outline. Many questions remain. For instance: What about death benefits? How are we to compensate for decreased life expectancy? How should the man be compensated when disabled while working in a lesser occupation than his regular one? What about administration and the desired composition of Workmen's Compensation Boards? At what level should the dollar be valued, and how should adjustments be made to compensate for the rise and decline of living costs in periods of prosperity and depression? What consideration should be given to fitting our plan into more comprehensive social security plans for unemployment, sickness, old age, and survivors' benefits?

While these and other questions are unanswered here, the purpose of this present outline on compensation for earnings is to show intent: (1) The human thing to do would be to relieve all cause for economic worry by compensating the disabled worker in full for wages lost during the time his disability prevents him from working. (2) But until it can be proved that compensation at full wages would be the most beneficial for all concerned, the suggestion is made that the disabled worker should not be penalized more than 25% of his wages when recovery and work incentives remain, and should not be penalized at all when incentives are no longer involved. (3) After rehabilitation and placement, compensation should be paid throughout life to counterbalance any deficiency in earnings which could be attributed to his disability.

3 COMPENSATION FOR PERSONAL LOSS: In addition to (1) immediate physical and vocational rehabilitation, and (2) immediate compensation for earnings, the disabled worker should receive (3) a sum of money in recognition of the personal loss he has suffered through his injury or disease. From compensation funds, this payment should be made in a lump sum as soon as the degree of disability can be determined. The purpose of this payment is no more than one of good ethics, an appreciation of the personal loss sustained. It should have no reference to other factors such as occupation, age, income, or ability to compete. Since this payment would not be connected with the payments for either the man's rehabilitation or his lost earnings, there would be no need for this sum to be large. Perhaps the lower limit should not be less than $10 for minor injuries and the upper limit should not exceed $1,000 for major losses, with attempts made to allow for damages such as cosmetic defects. These payments would not be excessive since the large majority of industrially caused disabilities are minor. The philosophy behind this payment is, to repeat, one of good ethics only.

As will have been noted during the development of the previous points on compensation for earnings, we eliminated the need of disability rating schedules as now used in America. Here, however, we still have need for a disability schedule—a personal loss schedule. But in this case, even with all of the shortcomings of disability schedules, we should not have to feel distress to the extent we do under the prevailing system. While present schedules are used to control the over-all compensation of disabled workers, in this instance we should use a schedule to compensate for personal loss only. Moreover, since our intent would be one of good will, charges of inequity would have less meaning. After giving our major attentions to the worker's physical, emotional, vocational, and economic adjustment, our efforts to compensate for personal loss in

addition should be welcomed; and this even though the personal loss schedule would be based on disabilities and therefore never could be fully equitable. In addition, this use of a schedule would not be so unfair since the range of payment would be less ($10 to $1,000), and thus result in less glaring discrepancies than at present.

At the beginning of this discussion, it was stated that workmen's compensation is based on any one or any combination of three basic concepts: (1) physical incapacity, (2) occupational incapacity, and/or (3) general incapacity for work. It was pointed out that the American system considers only the first—the degree of physical incapacity alone (except in California where occupational incapacity also is considered). In our plans for the future, how well have we allowed for these three concepts?

Under INTEGRATION, the attempt has been made to show:

First, compensation for (1) physical, (2) occupational, and (3) general incapacity for work has been provided under *Compensation for Earnings*. This is accomplished by compensating the man for his lost earnings until he returns to work, and by providing thereafter for any deficit in post-injury earnings to be made up from compensation funds. From this standpoint, the man's specific disability and occupations are of little concern. As long as his disability (whatever it is) prevents him from working (the important thing), he receives compensation. (Through rehabilitation, this period is held to the minimum.) As far as occupational incapacity is concerned, the only difference is that he receives compensation for a longer period when he needs retraining and placement on a new job than when he can return without training to his former job. After returning to work, old or new, all deficiencies between previous and present earnings are compensated thereafter. In this manner, all three of the basic concepts in workmen's compensation are fulfilled. Furthermore, such factors as age, sex, race, education, and the ability to compete are automatically recognized in fixing compensation.

Second, it is held that allowing for these three concepts through compensation in the form of money alone is not sufficient, that the man's general well-being should be considered in addition. Under *Rehabilitation*, we have emphasized this aspect by showing the importance of the man's physical-emotional-occupational adjustment—the development of his physical capacities and emotional drive for life and work.

Third, ethical values have been considered under *Compensation for Personal Loss*. In addition to all of the above, it has been suggested that recognition and appreciation of the man's personal loss should be shown through the payment of a relatively small sum of money.

C. Research Steps

1 WHAT HAPPENS TO INJURED WORKMEN? In the light of previous suggestions, it should be clear that much can be done to improve workmen's compensation in America without extensive research. Even though improvements are made now, however, this would not eliminate the need of research. The question of what happens to injured workmen should head our list of research undertakings. Few such investigations have been made. Those which have been done were on such a small scale as to be of little or no real value. In order to find out what happens to injured workmen, a nationally directed study should be made so as to arrive at comprehensive conclusions. The national study should cover the most important industrial states. National findings could be applied by all the states as they desired. Of course, there is nothing to prevent an individual state from studying its own problems. Hence, for either a national or state investigation of this problem, the following suggestions are made:

1. The questions we would want to answer are these: What effects do industrial injuries and diseases have on the (a) personal, (b) domestic, (c) vocational, (d) avocational, (e) economic, (f) social, and (g) cultural lives of workmen?

2. In order to find this out, we should:

(a) Decide on the industrial areas to be investigated—within the state, if a state study; within the nation, if a national study. For national coverage, perhaps no fewer than the 10 principal industrial states should be investigated.

(b) Establish the proper relations within these states to conduct the study.

(c) Search accident files for names and addresses of injured workmen.

(d) Call on industrial plants for names of previously injured workmen now employed by the plants.

(e) Personally interview workers with the aid of a well-developed questionnaire. Much of this could be done in plants, but a considerable portion would have to be conducted in the homes of workers and in hospitals. For a national survey, perhaps no fewer than 10,000 case histories should be recorded. The proper size of the sample would be a statistical problem to be worked out in advance.

3. In finding out what effects industrial injuries and diseases have on the lives of workers (seven phases under (1) above), our questionnaire should be so designed, and our sample should be so nearly complete, as to cover workers (a) in all industrial injury and disease categories, (b) in all compensable occupations, (c) of all ages, (d) of both sexes, (e) of different races, (f) with different education, (g) with different numbers of dependents, and (h) with injuries of short, medium, and long existence, thus covering periods of war, prosperity, and depression.

4. In addition to obtaining the histories of injured workmen, attitudes should be gathered from (a) the workers' families, (b) employers, (c) unions, (d) compensation commissions and carriers, (e) rehabilitation agencies and physicians, and (f) other interested persons.

5. Also, information should be obtained from the worker and others on both his physical rehabilitation and his vocational rehabilitation, finding out:

(a) How soon his physical and vocational rehabilitation started after he became disabled.

(b) Circumstances surrounding these two phases of rehabilitation, criticism, and the results obtained.

(c) Duration and cost of physical and vocational rehabilitation.

This study would have to be made objectively and without allegiances to anyone or anything outside of scientific method. While this work might take several years to complete, the findings would be invaluable. Until this type of study is made, we shall remain in the dark and flounder by citing individual cases, or small numbers of cases, to prove or disprove almost any point at will.

2 COST STUDIES: Either with or without the above survey, there are several simpler studies which should be made concerning costs:

1. *Present System and Proposed Plan:* Although perhaps surprising, it is highly probable that the proposed plan would cost considerably less than the present system of workmen's compensation. This point, to be sure, needs study and proof. Here are, however, some of the indications: Under a combining of physical and vocational rehabilitation, there is no doubt that the worker would be returned sooner to his old or new work. Rather than being paid $5,000 for a lost arm and then set adrift, a man would be compensated at 75% of his wages and returned to work as soon as possible. Perhaps most such lost-arm cases would be working again within one year and almost all within two years. This would mean that much less than $5,000 would be paid. (Moreover, the $5,000 figure is a conservative one. The principal industrial states pay more than this, one state paying as high as $12,950.) True, in addition to his 75% payments, he would be compensated for personal loss —in this case, possibly around $500. If he returned to his old job and made good, there would be no further payments. If he had to take new work, and if his new wages were lower than his pre-injury wages, the deficiency would be paid for life. But, balancing out all cases, and adding the knowledge that the majority of workers do return to their old jobs, we have the probability that the proposed plan would not cost so much as the present system.

While it is likely that the costs would be less, paradoxically, the benefits would be greater. If we concentrate our attention on the man's physical-emotional-vocational-and-economic well-being rather than on merely "buying him off," the man can be made a useful and productive person, satisfying himself by satisfying society. That there is the possibility of doing this at less cost than at present is remarkably significant. Yet even if the proposed plan (or another plan which would improve our present system) did cost more, this fact would not eliminate the need of replacing our present system with something better.

2. *Physical Rehabilitation:* The cost of physical rehabilitation under the present and proposed plans would be the same, and, as at present, would be paid largely from compensation funds. This is not to say, however, that physical rehabilitation should not be improved. The cost of improvement should be studied and plans made for its advancement, regardless of what compensation plan is in effect.

3. *Vocational Rehabilitation:* Similarly, vocational rehabilitation costs (which, as a rule, are not paid from compensation funds) should not enter into discussion of the comparative costs of the present and proposed systems. On the other hand, it is evident that cost studies should be made and plans laid for the expansion and liberalization of the vocational rehabilitation program in order that better services may be given to industrially disabled workers as well as to other physically handicapped persons.

Should there be those who would insist on charging improved physical and vocational rehabilitation services to the proposed plan, the chances are that even with these additional charges the proposed plan would still cost less than the present system.

4. *Percentage of Wages Study:* We speculated earlier on whether it would be better to compensate at 100% or at 75% of the man's wages during his period of physical and vocational rehabilitation. In the true sense, this problem makes a psychologic study; but in its results this study will bear also on the cost of the proposed plan. If, with the 100% payment, the study showed that workers remained safety conscious on the job, and that they got well faster and returned to work sooner, the 100% payment would likely represent a saving rather than an additional cost.

3 HISTORY: No research would be complete without studying the history of the problem at hand. While the history of workmen's compensation on a world-wide scale has been recorded by the International Labor Office and others, the task remains to expand this work and to keep it current. One weakness in these histories is that they do not correlate and incorporate the advancements of medicine, psychology, engineering, and education into a composite picture. Additional histories in these fields should be combined and used in developing plans for the advancement of workmen's compensation to the greater advantage of the worker, industry, and society.

D. Advantages and Disadvantages

THE chief disadvantage of the proposed plan is that many of its details remain to be developed and proved. This is true particularly for the subject of costs. It is clear at this stage, however, that the philosophy of the proposed plan constitutes its greatest strength. For this reason, it should prove superior to the present

system if given the chance. To start building on human values rather than continuing the man-machine philosophy, should result in the advancement of workmen's compensation. Likewise, to stand compensation philosophy on its feet and consider abilities rather than disabilities, individuals instead of groups, and the advantages of rehabilitation over dehabilitation, should carry us forward many paces.

For the industrially injured or diseased worker, our plan should advance his physical-emotional-occupational-economic-ethical-and-general well-being. On the other hand, the question may be asked how the worker will benefit economically when the proposed plan will cost less than the present system. The answer is that he will have economic security under the proposed plan, rather than being paid a sum of money and forgotten as under the present system. As long as he cannot work because of his disability, he is protected financially. After returning to work, he receives any deficiencies in earnings between his new and former wages for life. While this gives full protection to the individual case, it nevertheless results in general savings, since improved rehabilitation will get the large majority of men back to their former work and regular wages sooner than at present.

For the employer, most likely, insurance savings and improved labor relations would result. Also, since our plan is designed to guard against carriers and employers making "token" placements (a placement to stop the 75% payments, after which the worker is laid off), the necessity for honest placements should give an impetus to improved medical, placement, engineering, and safety programs within industry. These programs, however, should not add to costs, but, as proved in practice, should net additional savings to employers.

For insurance carriers, probably less business volume and less profit would result. Rehabilitation would get the man back to work quicker and at less cost than at present. Also, the better medical, placement, engineering, and safety programs within industry would result in improved placement for the disabled and in fewer accidents for all workers. Furthermore, carriers may object to the fact that a case is never actually closed under the proposed law. But, at the expense of life, life should not be forced through a slide rule to satisfy the convenience of making tidy financial calculations. Under the proposed plan, insurance costs would, admittedly, be difficult to establish at first. As time passed and as experience was gathered, however, this difficulty would be eased.

For compensation administrators, a reshuffling of duties would be necessary, but the present personnel should remain about the same if not somewhat less in number. By and large, the majority of cases would involve even less work than at present—nothing more than paying 75% of the worker's wages until he returned to his former job. For that minority of cases which would require further handling because of deficiencies in their new earnings, no greater problem should be experienced than the present one of compensating non-scheduled disability cases.

For vocational rehabilitation work, a decided expansion and improvement should result, and benefit not only the industrially injured and diseased but all disabled persons.

For physical rehabilitation and the medical profession, it is believed that a forward step would be recognized in the development of rehabilitation teams and training shops within our larger hospitals, as well as better medical and health programs within industry.

Finally, for society, our plan should produce a feeling of pride in progress, a satisfying thought that workmen's compensation was beginning to catch up with the more progressive and human outlook developing within modern industry.

VIII. Conclusions

THE obsolescence of workmen's compensation in America is a frozen fact. Since the present system cannot be repaired, it must be replaced. With the goal of developing a superior plan, an objective fact-finding board should be established to study every aspect of the problem on a national scale. The board should work closely with the states and assist them in effecting improved conditions.

IX. Summary

WORKMEN'S compensation in America is restricted in scope. Its permanent disability rating schedules compensate only for physical incapacity, the degree of physical loss. Occupational incapacity is not considered (except in California). When two workers are hurt alike, they are compensated alike, even though one can and the other cannot return to his previous occupation. Fairness dictates the desirability of compensating for occupational incapacity. The disabled worker who cannot resume his former employment should receive more compensation than the similarly disabled worker who can.

If the respective disabilities which different jobs would tolerate could be determined, it would make it possible to know in advance whether an injured worker could return to his job after recovery, since both his disability and the disabilities his job would permit would be known. In this manner, occupational incapacity could be compensated.

It is foolhardy, however, to attempt to determine the disability tolerances of jobs. This is true, first, because of the extensive variations in the physical and environmental demands of jobs, and, second, because of equally extensive variations in the capacities of disabled workers within any specific disability classification.

More serious is the fact that these same variations in the capacities of disabled workers also make it impossible to compensate equitably for physical incapacity, the one thing the present system tries to do. Identical injuries do not pro-

duce identical, or even similar, consequences for different individuals. Besides failing to compensate fairly for physical and occupational incapacity, the schedule system is helpless when faced with the problem of compensating with respect to such factors as age, sex, race, education, and the ability to compete. Without doubt, the present system deals in an anemic form of arbitrary justice. And more regrettable still is the tendency to let the disabled worker drift, once his disability has been priced and he has been paid.

It is believed that the present system should be replaced—it cannot be repaired. The principle of compensating injured workmen in a manner similar to paying for damaged machines constitutes a robot philosophy. Not as machines but as human beings should workers be considered in plans for the future. Physical and vocational rehabilitation should be combined at the outset, integrating the man's remaining physical, emotional, and occupation capacities to assure a safe occupational future for the good of the man and society. The disabled worker should be protected economically by being compensated for his loss of wages while unable to work (rehabilitation reducing this period to the minimum). After returning to the job, old or new, any deficiencies in earnings attributable to his disability should be compensated for life. In addition, ethical values should be considered and the man paid a conservative sum in recognition of the personal loss he has suffered. Combining these proposals, it is likely that this plan would cost less than present practice. Yet the man's physical-emotional-occupational-economic-ethical-and-general well-being would be advanced. Moreover, this would be true whatever may be the worker's disability, occupation, age, sex, race, mentality, education, or ability to compete.

No claim is made that the proposed plan is the best plan for the future. A national research board should be formed to study workmen's compensation thoroughly. It should be empowered to assist the states in recommending and legislating changes to bring workmen's compensation into line with the progressive developments within modern industry.

X. Acknowledgments

DEEP appreciation and personal debt are expressed to the following friends who read and criticized a preliminary draft of this paper in its entirety and gave many valuable suggestions: (This is not to say, of course, that either they or their organizations have committed themselves either for or against the views expressed in this paper in any manner whatsoever.)

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AN apology is made for the omission of a bibliography. Actually, this article was written on yellow paper on a barren table with pencil in one hand and eraser in the other. As sources came to mind, they have been mentioned in the text. To ferret out and list additional references now would be but academic ostentation. In theoretical writing of this sort, the guiding principle has been one of a free mind desiring honesty. A spade has been called a spade without running for the cover of a reference. Many statements will be challenged. But maybe some won't, and perhaps some good will come from it all. For all of the shortcomings, however, the author alone is responsible.

A Beryllium Case

Reported by
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Marion, Indiana

IN VIEW of the increasing use of fluorescent lamps for lighting purposes, I believe that all industrial physicians will be interested in our report of a beryllium case.

Sometime during the month of September, 1947, a fluorescent lamp fell onto a work table in front of an employee. The lamp shattered and the employee received what was thought to be a minor, superficial laceration of the anterior surface left wrist. Unfortunately the wound was dressed by a matron trained in first aid and not seen by a professional person.

The wound healed only partially and continued to break down and discharge a weak watery solution. The employee also noticed a ridge of small tumor-like tissue growths along the wound line but she continued to work and unfortunately neglected professional attention.

About January 30, a bulletin was issued by the General Office covering the possible hazard in fluorescent tubes and recommending great care in handling. It was at this time that the case became noted as a possible beryllium case and referred to the plant physician. His office in turn referred the case to the Medical Director of the company who fortunately had recently been apprised of this type of hazard and had studied beryllium and its possibilities as part of his work.

The Medical Director visited the patient at the distant plant. She was a healthy, intelligent, well-developed white female of 35 years; an experienced employee with many years of service, and one very proud of her attendance record. This, in part, explains her failure to follow up her accident with professional advice and treatment available at the plant during the day shifts and on call.

The wound was examined and two small keloid type formations about ¼ inch in diameter were noticed, with several much smaller areas in between. They were vascular in appearance and covered by a thin layer of epidermis which showed evidence of frequent breakdown. There was no exudate at the time.

Early surgery was advised after x-ray examination. The latter was negative for the presence of radiopaque foreign bodies. Unfortunately photographs were not taken of this most interesting case.

April 30, the lesions were excised and primary suture of the defects was performed by Dr. J. P. Powell, of Marion, Indiana. Sutures were removed on May 7 and primary union had occurred. There was no reaction in the incision. The patient, however, will be observed for at least one year to be certain there is no recurrence of the granulomatosis lesions.

The May 5, 1948, laboratory report by Dr. L. G. Montgomery, of Marion, Indiana, was most interesting. *Gross Description:* Two elliptical segments of skin and subcutaneous tissue each measuring 15 by 5 by 3 mm. Irregular segment of soft white tissue measuring 6 by 5 by 4 mm; entirely sectioned. *Pathological Diagnosis:* Segments of skin with epithelial atrophy and subepithelial intradermic chronic multiple granulomata with central caseation, necrosis and giant cell formation. There is overlying epidermal atrophy grade II and superficial crusting. *Note:* There is nothing characteristic about this lesion that would specifically differentiate it as having particular etiology.

The pathologist was extremely interested in this case and furnished tissue samples to Dr. Joseph C. Aub, of Harvard University, Boston, and Dr. A. J. Vorwald, Director Saranac Laboratory, Saranac, New York. Both men have been conversant with beryllium and its effect upon the human body and are considered experts in this field.

Dr. Robert S. Grier, of the Cancer Commission of Harvard University, adds the following:

"The case that you mention is a most interesting one and the history of the injury and apparent causative agents sounds very much like three cases we have seen with subcutaneous granulomata following cuts on fluorescent tubes. We are very much interested in the attached pathological report and, in most respects, it seems very similar to the granulomas we have seen. The presence of necrosis in the lesions we have felt was a partial differential point in distinction from sarcoidosis. We have seen necrosis in the skin lesions, but there are areas in all our sections where there is no necrosis and these would be indistinguishable from sarcoid. Another point we have noted in our cases is the presence of peculiar inclusion bodies in the giant cells which have been called 'conchoidal bodies,' or 'Schaumann bodies.' These are also seen in sarcoid but in far fewer numbers than we have seen in pulmonary and skin lesions of people exposed to beryllium compounds.

"As to whether this condition is peculiar to beryllium in fluorescent tubes, I don't think we can give a definite answer beyond saying that we

haven't seen anything else like it and the granulomas in the skin are very similar to the granulomas that one sees in the lungs of people who have died from the chronic pulmonary form of granulomatosis and who have worked with fluorescent lamp powders. However, similar lesions have been described in the literature where beryllium did not seem to be a factor."

We must differentiate this condition from sarcoidosis and tuberculoid granulomatous lesions.

Dr. A. J. Vorwald, Director of the Edward L. Trudeau Foundation gives the following impression:

"The pathology is similar to that observed in skin lesions from other cases suffering implantation of fluorescent powders into the skin. The large mononuclear cell granulomas resemble also the unit lesions found in the lungs of workers exposed to beryllium phosphors and having pulmonary granulomatosis. The tissue reaction is modified, however, by the presence of necrosis and round cell infiltration of inflammatory cells, presumably the result of high local concentration of the etiological agent and/or of secondary infection.

Diagnosis

Subepidermal granuloma resulting apparently from local implantation of a beryllium phosphor."

American Foundation of Occupational Health First Fellowship

THE FIRST Fellowship for post-graduate training in occupational medicine to be granted by the American Foundation of Occupational Health has been made possible by the continuing contributions of $10.00 to $25.00 from the membership of the AAIP-&S. Over $3,100 from over 200 contributors has added enough to the fund to make it possible to announce that this first Fellowship will be set up this fall. The Trustees are studying the available courses at four universities and medical schools. This Fellowship will represent a grant of about $6,000 which will pay the university and medical school its proper expenses for the training, and there will be a sufficient balance so that a substantial monthly honorarium for sustenance expense can be granted during the training period to the most worthy and promising candidate. Although several candidates have been interviewed already, this notice is given in the hope that other deserving physicians interested in this specialty field of occupational medicine will send in their applications for Fellowship training to the American Foundation of Occupational Health, Room 1300, 28 East Jackson Blvd., Chicago, 4, Illinois. Watch for additional releases and information about this Fellowship.

The Phlebological Treatment of Arthritis of the Knee

OTTO MEYER, M.D.,
New York

THE phlebological treatment of arthritis of the knee is based on my observations over a period of 16 years that most cases of acute and chronic arthritis of the knee joint are the result of the disruption of the normal circulation in the leg by the effects of a phlebitis or thrombophlebitis of the deep leg veins.

I observed this fact for the first time in 1933 while treating patients for phlebitis and thrombophlebitis in the deep veins of the lower leg with pressure bandages. I noticed that the application of the pressure bandages to the leg below the knee also relieved the pain in the inflamed knee joints of nearly all patients suffering from a synchronic chronic arthritis of the knee. It seemed significant that the progress in the relief of the painful knee joint was in proportion to the improvement of the phlebitis for which the patient was treated. Further observation disclosed that most of these patients were also suffering from a concealed (latent) stenophlebitis of the femoral veins. Since the femoral veins drain the knee joint, and since an obstruction in these veins must lead to a venous congestion of the knee joint, I concluded that the beneficial effect of the pressure bandage treatment of the phlebitis in the lower leg on the inflamed knee joint was due to the improvement of the venous circulation which removed the venous congestion of the inflamed knee joint. To test the correctness of this conclusion, I began to include the inflamed knee and the thigh up to its middle into the pressure bandage, thus increasing the action of the pressure bandage. This procedure effected prompt decongestion of the inflamed knee joint with dramatic therapeutic results. I was now certain that the drainage of the accumulated venous blood and tissue fluid from the inflamed knee joint effected by the pressure bandage treatment was responsible for the restoration of the joint.

Since then I have used this effective treatment for arthritis of the knee, which is based solely on removing the venous congestion from the inflamed knee joint, with excellent results in over 800 patients who were suffering from (1) traumatic arthritis, (2) gonorrheal arthritis, (3) rheumatoid arthritis, (4) osteoarthritis, (5) arthritis due to sprained ankle, and (6) arthritis following burn of the leg.

Arthritis of the knee joint therefore, being caused in most instances by venous congestion of the knee due to a stenophlebitis of the deep leg veins, can be treated effectively only by restoring normal venous circulation and removal of the causative inflammatory phlebostenosis.

This is accomplished most easily and effectively by application of elastic compression bandages from the toes to a point at the middle of the thigh. The action of the pressure bandage, by increasing the power of the skeletal muscle pump, the principal factor in keeping the venous blood in motion, not only forces the venous blood through the inflamed stenotic sections of the calf veins which are within the grip of the bandage thus flushing out the congested knee joint, but also increases the *vis a tergo* of the venous blood stream sufficiently to push it through phlebostenotic sections of the femoral vein above the bandage, thereby restoring a normal venous circulation in the leg. At the same time it heals the deep phlebitis, thereby preventing recurrence of the venous congestion of the knee.

The treatment of an inflamed knee joint with elastic compression bandages relieves pain quickly, and effects a cure within a comparatively short time. It is relatively inexpensive and, being ambulatory, permits the patient to continue his work.

The pressure bandage treatment of arthritis of the knee has been tested by a number of such well known authors as Comroe, Copeman, Crowe, Faber, Koehler, Ochsner, Schmidt, Thorndike, and Truslow, all of whom have reported good results obtained with this method. It is therefore difficult to understand why this treatment, being far superior to all the other therapeutic methods generally employed in treating arthritis of the knee, is not being used more widely.

THE importance of venous congestion in inflamed joints has been stressed by several authors.

Bernstein and Fisher state in their paper on traumatic arthritis: "An injury to the knee joint with internal derangement causes the synovial membrane to become edematous and hyperemic; the fat pad participates in the inflammatory reaction and as a result of hyperplasia, thickening and exudation fills the anterior compartment of the joint. The villi may become pinched; thrombosis of its vessels may result and necrosis may follow."

In several papers I have stressed the importance of venous congestion and capillary stasis as the predisposing factors in the pathogenesis of arthritis. Since the joint cavity is, embryologically speaking, an enlarged tissue space, and therefore the synovial fluid is a true tissue fluid, it is obvious that the synovial fluid is in intimate contact with the blood capillaries and lymphatic capillaries. It is also noteworthy that the avascular cartilage depends for nutrition on the synovial fluid. Therefore the joint is very vulnerable to the injurious effect of venous congestion. The venous congestion in a joint is caused by an obstruction of the proximal veins, either by latent endophlebitis, or by thrombophlebitis. Both conditions produce narrowing (phlebostenosis) of the proximal veins and thereby interfere with the

Fig. 1.

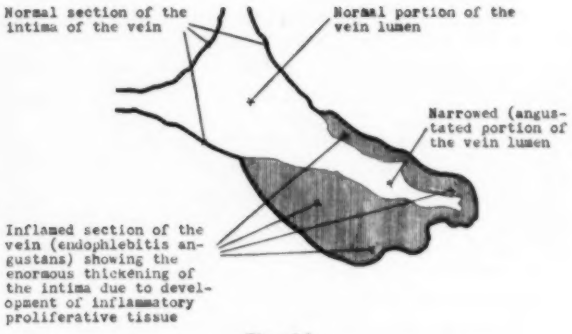
Normal section of the intima of the vein
Normal portion of the vein lumen
Narrowed (angustated portion of the vein lumen
Inflamed section of the vein (endophlebitis angustans) showing the enormous thickening of the intima due to development of inflammatory proliferative tissue

Fig. 1A.

Fig. 1, left, Endophlebitis Angustans. Microphotograph of an inflamed vein draining an arthritic knee joint (H. Siegmund)

Fig. 1-A, above, diagram of Fig. 1

drainage of the venous blood from the inflamed joint.

According to a statement by Edstroem, an authority on joint pathology, the important role played by the veins in the pathogenesis of arthritis has been completely neglected by the pathologists.

At my suggestion Siegmund examined the proximal veins in rheumatoid arthritis of the knee joint. The illustration shows the enormous proliferation of the endothelium which narrows the lumen and by its obstruction is apt to cause venous congestion (Fig. 1). This is, to my knowledge, the first time in the history of medicine that proximal veins were examined pathologically in arthritis of distal joints.

Bernstein produced experimentally arthritis in the knee joints of dogs by ligating the branches of the femoral veins which drain the knee joints, and thus producing venous congestion.

Bick stressed the importance of venous congestion in osteoarthritis when he stated: "Whatever its cause, the changes within the joint are the expression of local chronic passive congestion in the tissues of the component parts."

In gonorrheal arthritis of the knee the missing link is the deep gonorrheal phlebitis of the femoral vein. Franz mentioned gonorrheal phlebitis of the femoral vein in his book "Die Gonorrhoe des Weibes." In all cases I found the femoral vein very tender on deep palpation when the muscles of the thigh were relaxed. All gonorrheal knee joints which had resisted all other treatment healed completely with this method.

In arthritis of the knee following a sprained ankle the deep posterior tibial vein in the calf region, and the popliteal and femoral veins were very tender and showed signs of latent phlebitis. Kaplan and Martland showed that a sprained ankle causes nearly always phlebitis in the deep veins of the leg and sometimes even embolism.

Immediate treatment of the phlebitis in the foot and leg with pressure bandages prevents the subsequent development of arthritis in the knee. There is only a swelling of the endothelium in the beginning which responds quickly to pressure treatment. After proliferative endophlebitis with production of fibrous tissue has formed, it takes considerably more time to heal the phlebitis with pressure bandages.

In two papers on burns I have stressed how spodogenic phlebitis spreads into the deep veins and causes thrombophlebitis. In several patients who had suffered from burns on the legs arthritis of the knee joint developed several weeks or several months after the burn. In all cases the tibial and femoral veins were sensitive to deep palpation. The treatment of the inflamed veins resulted in complete restoration of the knee joint.

The treatment of inflamed knee joints with pressure bandages is ambulatory. It is amazing how quickly patients obtain relief with this treatment. Absolute rest permits the formation of adhesions.

In a paper on abuse of rest in arthritis, I have stressed the fact that, generally speaking, rest is conducive to stiff joints and ankylosis. It is natural that we select the proper cases for ambulatory treatment. However, even in acutely inflamed joints we apply an elastic pressure bandage which gives marked relief almost immediately. It seems that the diminishing of the pressure in congested tissue is the most important factor in relief of pain.

Crowe states that nothing is so comforting to a painful knee, especially if there is any sense of insecurity, as an elastic bandage applied very tightly. He points out that for painful ankles and insteps the relief given by elastic bandages is quite remarkable.

Schmidt, in a paper on the relationship between latent phlebitis and arthritis, reported very good results with this method of treatment, the combination pressure bandage, in acute inflammation of the knee which followed acute tonsillitis, and also in a patient with chronic arthritis in the knee joint who was brought to him on a stretcher. After a few strappings the patient was able to walk 500 yards with a cane.

During this form of treatment the patients may continue to work. Edema of the leg can not occur under the pressure bandages.

The pressure bandage, exerting a constant compression, hastens the absorption of the exudate. With this method one may avoid the use of aspiration.

Comroe states in his book "Arthritis" that in many overweight women with large legs pain in the knee is greatly reduced by application of elastic pressure bandages.

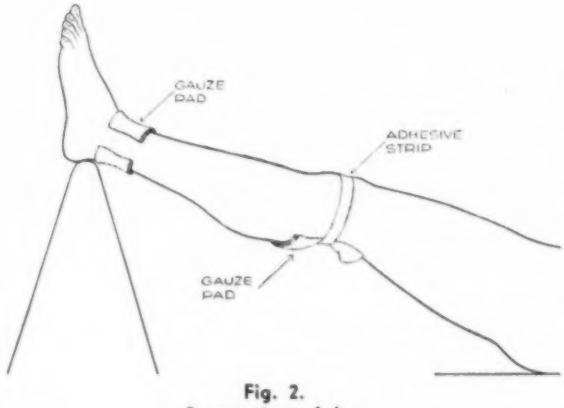

Fig. 2.
Preparation of leg

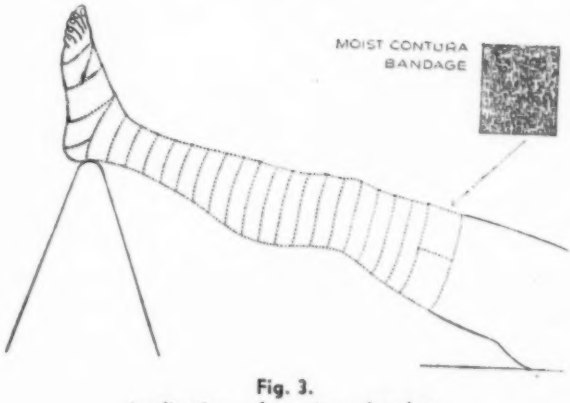

Fig. 3.
Application of contura bandage

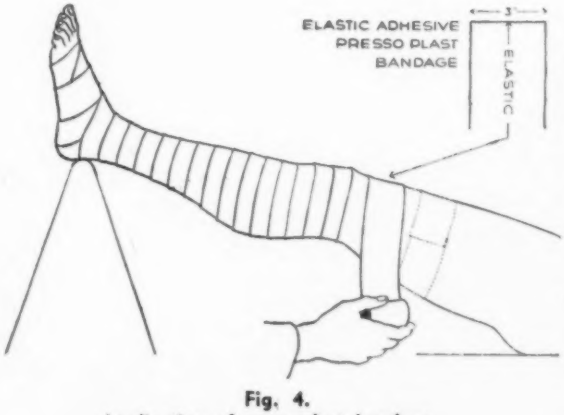

Fig. 4.
Application of pressoplast bandage

Faber reported about good rsults in rheumatoid arthritis of the knee joint with compression bandages.

It is usually much easier to prevent a deformity in arthritis than to cure one. I never saw an ankylosis develop with this treatment.

The use of stiff plaster of paris bandages has to be condemned, because it immobilizes the muscles whose contractions are so important for the return of the venous blood. Some authors were able to produce experimentally arthritis with stiff plaster of paris bandages. In order to prevent arthritis of the knee joints in fractures of the femur, plaster of paris bandages should be replaced by strong elastic adhesive bandages as soon as a good union has formed.

Since latent endophlebitis of the femoral vein is a common occurrence in fractures of the thigh, it is advisable to examine the femoral veins by deep palpation with the thigh muscles relaxed. Tenderness of the veins on deep pressure with the muscles relaxed indicates phlebitis. Healthy veins (e.g. dorsal hand veins) do not hurt on pressure.

Technique of the Combination Pressure Bandage

I HAVE used for many years the combination (contura plus pressoplast) pressure bandage in arthritis of the knee. In order to avoid edema of the foot, the bandage has to be applied from the base of the toes to a point at the middle of the thigh. The heel has to be enclosed.

The technique is very simple and takes little time (Figs. 2, 3, 4). There are four steps:

(1) Protect instep and achilles tendon with a piece of gauze spread with vaseline, and region directly below the knee with a piece of plain gauze.

(2) Pad the popliteal space under the knee with several layers of gauze spread with vaseline.

(3) Apply contura bandage under little pressure from toes to the mid-thigh including the heel.

(4) Apply the elastic, adhesive, three inches wide pressoplast bandage from the base of the toes to the mid-thigh under even, strong pressure. The heel has to be enclosed in the bandage.

For details of the treatment of phlebitis and thrombophlebitis with compression bandages I refer to my paper in *Surgery*, June, 1947.

The Action of the Combination Pressure Bandage

THE purpose of the compression is the decongestion of the joint. Since venous congestion plays such a great role in practically all forms of arthritis, it is obvious that the logical treatment for venous congestion is decongestion of the joint. Besides, in all chronic inflammations, the veins become inflamed. The effect of muscular contractions of the venous flow can be observed by bloodletting from the cubital veins when the patient opens and closes his fist, thereby exerting contraction of the forearm muscles. The flow of blood to the bloodletting needle can be considerably increased by applying the elastic bandage centripetally around the forearm. In this way all the pressure energy is concentrated on the under-

lying veins, and no energy is lost into the empty space. Within a firm bandage that is adapted to the contour of the extremity, and that offers a firm counter-pressure to the contracting muscles, the contraction of the muscles concentrates on the deep veins and pumps effectively the excessive tissue fluid into the veins. The pressure bandage acts on edematous tissue like a fist which compresses a water-soaked sponge. Large protein molecules in the tissue fluid that can not be absorbed by the venous part of the capillaries and venules, will be absorbed by the lymphatics under considerable pressure from the outside.

Elastic stockings, not offering firm enough counterpressure to the contracting muscles, are useless for therapeutic purposes in the treatment of phlebitis. They are only useful as a cosmetic aide after the phlebitis has healed, to conceal discolorations, scars, and enlarged skin veins.

The moist contura bandage which stays moist under the waterproof pressoplast bandage increases the action of histiocytes in the connective tissue which act as scavengers in inflamed tissue. Renzo Masuda proved experimentally that moist compresses at body temperature activate histiocytes and offer an ideal and active antiphlogistic action.

Besides, the contura bandage protects the skin and makes shaving unnecessary.

Decongestion of a joint effects removal of edema and makes room for the inflow of arterial blood. The pain is relieved by removal of pressure in the congested tissue.

Summary

TREATMENT of inflamed knee joints with compression bandages is far superior to other methods of therapy.

The venous congestion present in an inflamed knee joint is removed effectively.

Pain is relieved by diminishing the pressure within the tissues of the inflamed joint.

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AAIP&S Directory

THE AAIP&S directory has gone to press and it will be available around October 1-15. It will contain the alphabetical listing and geographical listing of the 1981 Fellows, members and associate members active at this time. There will be other interesting information, such as dates, cities and hotels where the annual convention meetings have been held, a list of past presidents and the years of their presidency, an analysis of the Association membership and the growth of the Association during the past 10 years. A copy of this directory will be mailed to each Fellow, member and associate member of the Association.

Who's Who in Industrial Medicine

"we thank you for yourself"

THE DECADE 1911-1920 was the period of the pioneers in industrial medicine. The few who had gone into it earlier and the few more who went into it then were literally "goers-before"—along untravelled paths, into an unmapped area. It is interesting to recall that in those days this area was considered, as McCORD says, a "field of anathema." Whoever entered it was regarded "with more of ire than tolerance"; his penalty was to be "shorn of a few of the outer garments of medical respectability." Industrial practice was *almost* beyond the pale. The professional enmity thus tactfully described was fashionable in select medical circles for a long time, but with no perceptible effect on the pioneers and those who followed them—except to strengthen the bonds that were to draw them close together in their own organization. Individualists all, they quietly pursued their courses, confident in the integrity of their work and the way they were doing it, and letting the results develop their own importances. And gradually the resentment softened to haughtiness, and the hauteur, lacking nourishment, died. And a man who probably never knew it existed, and who if he had known was too big to care, pronounced its epitaph. This, however, was merely an incident in a fruitful and significant career....

CASSIUS HINDS WATSON, M.D.

CASSIUS HINDS WATSON was born at Brooklyn, New York, in 1878. When he was four his parents moved to Danbury, in western Connecticut—returning to the part of the State which for almost 250 years had been the home of the family. John Watson, the first of the line, came from England and settled at Hartford in 1644, in which year the records show him as having been a "juror," and as marrying a young Miss Smith whom he was said to have saved from drowning when a storm blew her off the ship on the way over. Their first-born was John, who became the father of Cyprian. Cyprian established himself at Bakerville, where the house he built (circa 1715) and the house built by his son Levi are still standing. Levi was a member of the Connecticut Legislature during the Revolution. His son Isaac Watson, born in 1764, had a cousin in the Continental Army who was at Danbury when it was burned by the British. Another cousin, Ebenezer. was a printer; among the books he published were those written by Ethan Allen. Isaac's son, Edmund, was a farmer and a paper manufacturer. His son, Wilbur Seymour Watson (1842-1921), a physician, married E. Louise Hinds, and when their first boy arrived Grandfather Edmund, who had a quoting acquaintanceship with Shakespeare, insisted on calling him Cassius. The middle name, Hinds, was the parents' compromise.

The boy grew up in Danbury in the home atmosphere more or less usual when the father is a family doctor. By the time of his graduation from high school in 1896 he had made up his mind to follow the same calling. To a studious youth it offered much of interest and appeal; and the possibilities of wider horizons than those of local practice seemed suggested when his father was appointed medical director of the Connecticut National Guard. After high school, he got a job as a clerk in a Danbury drug store, and for a year he applied himself to the business of a practical behind-the-counter insight into the pharmaceutical side of medicine. In 1897 he entered the University of Pennsylvania, majoring in biology. Big and strong, and as vigorous in body as in intellect, he went out for football and rowing. He was a member of the University of Pennsylvania football squad in 1899 and 1900, in the days of the "guards back." In the first of those years the U. of P. finished a winning streak of two seasons without a defeat. His fraternity was Delta Tau Delta, national, and in his senior year he received scholarship election to Sigma Xi, honorary.

Graduating in 1901 with the degree of Bachelor of Science, he was appointed Harrison Scholar in Biology, with the intention that he was to get his medical education in a three-year course at the U. of P. School of Medicine. But the financial situation was such that he had to go to work for a while, and here he was almost diverted from his long-time ambition. His high school reading had included the "Tom Brown" classics, and Arnold of Rugby, more than any character he had known or read about, was his youthful ideal of personality and career. Like Arnold, he wanted to be, in American equivalent, a "headmaster," and so, when three teaching positions were offered him he was tempted. One was at Allegheny Preparatory, Meadville, Pennsylvania; one in a similar school at Mobile, Alabama;

the third at Pratt Institute, in Brooklyn. The latter would allow him to arrange his time so that he could take the four-year medical course at nearby Long Island College of Medicine, where his father was graduated M.D. in 1884. He decided on this; became an instructor in biology, mathematics and the natural sciences at Pratt Institute High School; and as soon as practicable enrolled for his medical course. He was coach of the Pratt Institute High School football team during the seasons 1901-1904.

On completing his medical course with the Class of 1905, he entered internship at Long Island College Hospital, following with an extended service there and a period as resident at Englewood Hospital, Englewood, New Jersey. In 1907 he started out on his own as physician and surgeon, setting up his office in Brooklyn. To the usual experiences of a young doctor beginning practice in a big city he added extensive work at various clinics in Brooklyn and Manhattan, teaching assignments at Long Island College of Medicine where he was Demonstrator in Anatomy and Instructor in Histology, and the continuance of a position at Pratt Institute as a lecturer on science. This latter position he kept for many years. His interest in industrial medical matters, and in safety, began in 1908 when some accident cases were sent him by the New York Telephone Company. He did well with these, more followed, and shortly this kind of surgery was a substantial part of his practice.

MEANWHILE throughout the country a wave of interest in employee relations other than those involved in the *quid pro quo* of work for wage and wages for work was gathering momentum. This found initial expression in plans for accident prevention among active employees and pensions for the superannuated. By 1913 it had assumed real importance to management; the National Safety Council was organized in that year, while in 1912 and '13 the number of formal pension systems in industry was increased by 65%—47 new ones being added to the 72 previously inaugurated. The non-contributory pension system of the American Telephone and Telegraph Company was one of the new ones; it was effective October 1, 1913, as part of an Employees' Benefit Fund plan. Another part of the plan contemplated some attention to employee health, and the officers in charge, having become well acquainted with DR. WATSON through his work in Brooklyn, selected him to be the Fund's medical adviser. An arrangement was made whereby he was to have office hours on a part-time basis at the Benefit Committee's headquarters, 15 Dey Street, New York; and there, in a cubicle over the boiler room, he could be found during most of the business hours of two days a week, listening to the employees who came to ask his advice, and telling them what to do.

Some time later, when the executive offices were moved to the building at 195 Broadway the Committee took its medical adviser along, giving him a "little place" on the 13th floor. This had the desk and chairs of a small office, but the only facilities to suggest that it was a doctor's office were an alcohol lamp, a test-tube, and a pail for the disposal of urine specimens. Here the part-time hours were continued, and grew routine; the "little place" was visited by an ever-increasing number, with ever more satisfactory results. One day the executive vice-president, MR. KINGSBURY, came in for advice about a pain in his mid-section which was bothering him. DR. WATSON cleared the top of his desk and told him to lie down on it. As he adjusted himself to the uncomfortable recumbency, MR. KINGSBURY asked, "Is this all you've got?" Then, without waiting for the obvious affirmative, he added: "It's not enough! No....!" Shortly thereafter, DR. WATSON received executive authority to establish a medical unit. The only specific instruction was "Do it right." He got a plant engineer to help him with floor plans and layout; ordered the furniture and equipment he would need; engaged a nurse.

The doctor's office was now definitely the company doctor's office. He was, however, still medical adviser, still part-time. A year or so later, in 1915, he was appointed medical director.

DR. WATSON'S appointment as medical director was the natural follow-up of his work as surgeon and medical adviser for the employees. It confirmed the company's recognition of the need for a real medical service and the tacitly unanimous selection of the man who was to be its chief. But it posed a problem for the man. He could continue his part-time relation with the company indefinitely while maintaining his own practice, or he could give up the latter and go into industrial medicine full time. He was 37; he had built a practice which, with his hospital appointments, kept him very busy. He was Attending Physician at Long Island College Hospital, Attending Surgeon at Eastern District and Bushwick Hospitals. As a surgeon he had earned the respect and confidence of the top men in Brooklyn and New York. A successful, even a great, future in surgery seemed assured. The alternative was a position in a new and unmeasured field—as to which his experience had already shown that the preventive and administrative phases would outrank the surgical. Persuasive on the company's side was the attitude of the management; he would have their full support; the original instruction to "do it right" was never amended. But his part-time relation had evolved a medical and surgical service adequate for the illnesses and injuries encountered from day to day, and there was no need for an immediate decision.

Here the influences that were to control his choice began shaping their pressures. These were several. One was the fact that he had been so long taxing to the limit his tremendous capacity for work that he was tired. He recalls the "tired," but that's as far as he'll go. Some

who were close to him in those days remember, as deeply grained in his nature, a characteristic that caused what they describe as tensions of conscientiousness. To him the doctor-patient relation was more than a confidential rapport; it was a joining of reliance placed, with responsibility assumed. Where the responsibility was his it had no degrees; the case was merged in the patient; the science was scientific only in terms of results. This put the burden on diagnosis, and diagnosis put it on him—to the extent that his search for the light of correctness, beginning with all he could summon from the knowledge and experience of himself and others, ended up in his soul. The suggestion of his friends is, therefore, that he began about this time to wish, subconsciously at least, that he could be relieved of some of the weight of the surgery he was carrying. In retrospect this seems probable. But it is likewise probable that this period saw the full ripening of the paramount interest in diagnosis that was to distinguish his future.

Another influence that bore on his final decision was his increasing awareness of industrial medicine as it was developing elsewhere. In 1915 he became a member of MAGNUS ALEXANDER'S Conference Board of Physicians in Industry which had been formed in April of the preceding year, and got acquainted with such men as CLARK, SHOUDY, FISK, PATTERSON, GEIER. Also there was correspondence with the Chicago group who, under the leadership of HARRY MOCK and ANDREW HARVEY, were establishing the American Association of Industrial Physicians and Surgeons. He was a charter member of this Association when it became official in 1916, but it was several years before he could be active in its affairs.

He learned much through these contacts, all helpful toward a third influence which was quietly leading him into full-time industrial work—the picture he was making in his own mind of an employee medical service that would really "do it right."

He drew in bold strokes:

Take the measure of sicknesses on the job....

Find out, in every instance, exactly what the trouble is....

Treat it, if it is of occupational origin....

See that it gets properly treated, if it is non-occupational....

Prevent its recurrence if it has a job cause....

Examine often enough for all possible control if it is not from a job cause....

Extend every aid to employees' doctors, and to employees....

If facilities are lacking to do all that is necessary, *pay for having it done* where facilities exist.

Never temporize with an employee illness for any reason whatsoever....

The expense of proper care is an investment, not a charity....

This meant the unsparing ultimate in examination, diagnosis, treatment. It was a statesman's concept. The executives of A. T. & T. were statesmen; they left the picture to its artist to finish in full detail.

Interesting at this point is an incident which lights up a part of this picture. Stony Wold in the Adirondacks, at Lake Kushaqua, New York, is a sanatorium for the treatment of tuberculosis. There employees of A. T. & T., the du Pont companies, and the Prudential Life Assurance Society who are found to be tuberculous are sent for rest and care—often for recovery. DR. WATSON was Stony Wold's president for many years. He still is. One day in 1938, at his A. T. & T. headquarters in New York, he received a letter which moved him, on a subsequent trip to Stony Wold, to detour through a certain town, hunt up an address, and ask for Sister Brenda.

"Sister Brenda," he was informed, "is now the Mother Superior."

"But," said that good lady herself a few moments later, "I am still the little telephone girl you sent up from New York to Stony Wold 21 years ago, at company expense, for 'her last chance.' You see how much it has meant...."

"Twenty-one years ago" from 1938 would be 1917. In those youthful days of industrial relations such an action was not only a precocious deed for a medical department, it was a seven-league stride for an industry.

IN 1917 DR. WATSON was about ready to decide in favor of his medical directorship. For some months he had been giving it an increasing amount of his time. But the United States got into World War I, the doctors flocked to the colors, and before he knew it he found himself carrying an added burden of surgery at home. Throughout the war period of 1917-'18 he and DR. ALEXANDER RAY shared the surgical work at Long Island College Hospital. Hard worker that he was, this kept him so busy that he couldn't join up with FRANKLIN MARTIN'S "Committee of One Hundred" when the industrial physicians of the country, under the leadership of OTTO GEIER, were "mobilized" for war production. He and his company were well represented, however—A. T. & T.'s WALTER GIFFORD was Director of the Advisory Commission of the Council of National Defense, of which DR. MARTIN was the medical member. After the Armistice in 1918 he had no doubt about his future. It was *not* to be a continuation of surgery. From then on he was A. T. & T.'s medical director, in full career and complete effort—free to do what he would, and what he did, with examinations, diagnoses, treatments....

AT THAT time the pre-employment examination —adapted by HARRY MOCK as early as 1909— was not yet widely used, but it was already a sore point with the unions. In a conversation with Samuel Gompers, A.F.L. president, whom he knew quite well, DR. WATSON answered one of labor's stock objections to it by asking Mr. Gompers how he'd like to find a man with "open syphilis" working at the next bench. Mr. Gompers, of course, wouldn't like it at all. When he

learned that the A. T. & T. examination was not to exclude any applicant but only to be sure that none would menace the work situation, he became interested. When he realized further that the company policy was nothing more than frank and mutual fairness when a new member was admitted to the telephone family, he was convinced.

Diagnosis by industrial physicians was a sore point, too—with other physicians. If anything was wrong, the individual's own doctor was the one to find the cause; and his office, not the work place, was the proper site of the study. DR. WATSON fitted out his medical department with every known diagnostic aid in the way of equipment and technical facilities, with expert personnel, and a background of consultant contacts. Then he disarmed the critics by offering them the free use of it, plus full cooperation. This was generally more than they could command, except in certain hospitals to which not many of them had access. They were won over.

Treatment was another matter of quibble. But when the private practitioners understood that A. T. & T.'s medical department had no time to quibble if the health of one of its people was involved, and that nothing was to be gained by standing on ceremony, they became respectful—and then friendly. "That great bear of a man" at the head of the department knew what he was doing. They could learn by working *with* him. They could—and they did.

This does not imply that there were showdowns or unpleasant instances in these respects. The contrary was the case. The significance is that something had happened to industrial medicine. A man had come into it of such professional and intellectual stature that he *lifted up* the matters in which he became interested; and the sieve of his attention just naturally let the little things drop through, while the important things remained—never again to fall below the level at which he held them. The lift he gave the industrial field was felt to its farthest edge. As a consequence of this, it was his lot to become its spokesman—not that it needed a spokesman, but that what he said had a timely and profound effect....

THE meeting of the American Association of Industrial Physicians and Surgeons at New Orleans in 1920 was the first he attended where he felt free to engage in the business at hand. He participated in the discussion of MAGNUS ALEXANDER'S proposal to subordinate the AAIP-&S identity in the Conference Board of Physicians in Industry, and expressed his views on other matters of current importance—with the result that thereafter he was a marked man in Association circles, sought for his counsel and valued for his advice. Many of the acquaintances he made there among the strong men of industrial medicine, some of whom he hadn't known before, ripened into firm and lasting friendships. He was several times a director and in 1930, at Detroit, he was unanimously elected president.

It was the custom then for the new president to publish an "Address of Greeting" to the members. His was a scholarly summation of recent advances in medicine, prefaced by these words: "I have seen the American Association of Industrial Physicians and Surgeons grow from a relatively small group of beginners in the movement of industrial medicine to as compact a body of earnest and well-equipped men as any professional group in the country. In fact, I have a secret conviction, which with due introspection each of you will find personally shared, that this Association is several grades above any of the other sectional groups." Earlier in the year, an editorial blast from the headquarters of organized medicine had suggested that plans be considered for curbing industrial medicine, confining its activities to their "just and proper domain," and causing it to relinquish "functions beyond its legitimate field." This *might* have meant diagnosis, treatment. If it did, there was no more shining target than the A. T. & T. medical department. But at the same time there was no man in industrial medicine whose position, as to personal and professional standing and company support, was more impregnable than that of its director. Nor was there any who would be less bothered by such an attack. It is not likely, therefore, that he intended to reply to it. The blast itself had a sort of interest, in that the eyes of the ireful and intolerant seemed now upraised in apprehension where before they had only looked down in scorn. But it wasn't important; only seven years later industrial medicine was to be given the accolade of recognition by organized medicine. He continued: "We are in the enviable position of being able to produce and still appreciate our own talents as well as our own products." Those were well-chosen phrases: "Enviable position....our own talents ....our own products." Not a declaration of self-sufficiency; merely a statement of truth. Every one of 1930's little band of 337 members knew it. All of them had "gone ahead and done those things unusually well that industry had required of them." That was their "legitimate field," and they, better than anyone else, could determine its boundaries. Nevertheless it was heartening to hear this said, and, even more, to hear CASSIUS WATSON say it.

BUT there was a deeper meaning, related to the fact that 1930 was an important year for industrial medicine. In the 20 years since 1910 the number of physicians and surgeons engaged in its practice had grown from 7% to 55% of the present-day total so engaged, while the aggregate of employees in their industrial charge had expanded to more than three-fourths of the 1948 figure. It was an accepted arm of *big* management, and its presence was a recognized sign of *good* management. Its rules and requirements of practice, developed in the first of the two decades and refined and seasoned in the second, were

well established. In 1930 the American College of Surgeons embodied them in the Minimum Standard for medical service in industry which it adopted that year. Soon afterward the A.C.S. Board of Traumatic Surgery—where LOYAL SHOUDY, WILLIAM O'NEILL SHERMAN, JOHN E. BACON and DONALD GUTHRIE were representative of steel, mining and railroads—changed its name to Board on Industrial Medicine and Traumatic Surgery. The first industrial physician to be chaiman of the A.M.A. Section on Preventive and Industrial Medicine and Public Health was TONY LANZA, elected in 1931. Industrial health, which was shortly to receive major attention in many quarters, had been given a powerful start in 1929, when LEVERETT BRISTOL was brought into DR. WATSON'S department as health director; his textbook, Industrial Health Service, is still the leading work on the subject. Slowly, steadily, industrial medicine had come of age; from 1930 on it was to have adult status in the over-all economics of both industry and medicine.

A Harvard professor, who teaches the history of science, explains that an important scientific event, such as the discovery of insulin for example, occurs at a particular time and not sooner because it has to wait until the "total situation" is right. This "total situation" is "a composite of technical heritage, social urge, the internal logical necessities of a science, and the prevailing scientific atmosphere." The important event here was the shifting of the burden of proof, after which industrial medicine was no longer on the defensive. This had to wait until 1930. Priorly the "total situation" was unfavorable, but in that year the elements of rightness joined with the time, and a new objectivity became evident. It fell to CASSIUS WATSON to point up this change. He was ready, and he spoke well. The "enviable position" sentence—in which he reduced the "technical heritage" of industrial medicine to a declaration of independence—was a masterpiece.

Of CASSIUS WATSON, this was to be expected. He was eminently qualified. His "products" had contributed much to the technical background; his "talents" had given him a deep understanding of the "internal logical necessities," he sensed a national temper in "the prevailing scientific atmosphere." Among his "products" were the refinement of the periodic—"birthday"—examination, and the development of diagnosis to a point of distinction on a par with nationally-known clinics. In the latter relation there is the story, from the early twenties, of the physician in an out-of-town industry who was puzzled by an employee ailment unprecedented in the local experience. After a conference by phone, DR. WATSON said to "bring him in." The physician and the employee arrived to find DR. WATSON and five of New York's leading specialists awaiting them. The trouble was identified, and corrected.

ON THE administrative side, DR. WATSON'S advisory capacity for all the Bell System included a country-wide adaptation of medical service standards to local conditions. His way of handling this was an innovation. He engaged an engineer as the medical department's "methods man"; turned over to him the numerous installation problems throughout the associate companies. There was more to his administrative talent than executive ability, even though his was of the order that would have carried him to the top if he'd gone into business. He had the qualities of a statesman. Not a political statesman, but a man of mind for the mass and heart for the individual. His was the rare faculty of seeing the group as an entity *and* an assembly; however it loomed in the total, it never lost the face of the one. He dealt with large numbers; the Bell System had upwards of 300,000 people in its employ. "They" were his charge. "They" were the night operator on the lonely station, the line crew on a storm-repair job, the maintenance man in the relay room, the typist in the office on the third floor. . . .his people to be *kept* well when they were; *made* well when they weren't. If they became cases, they were patients; if their troubles evolved as statistical quantities in a report or tabulation, the significances were no less human than scientific.

In reviewing the statesman-like breadth and boldness of this man's concepts one is reminded of Winston Churchill. And in realizing the intellectual and scientific integrity of their execution one thinks of Herbert Hoover. CASSIUS WATSON bears an interesting resemblance to both. Like Churchill, he made "no little plans." He didn't have the Churchill flair for drama; he didn't need it. Like Hoover, he knew his plans in detail as well as scope; his technical information was always complete and sure—there was never a time when he wasn't abreast of the newest developments and trends in his profession. Like both, he was a steady and serious reader, ever the student. This is reflected in his writings. Not numerous, these were timely in subject "well-digested" in reasoning, profound and often severe in style—with flashes of the Churchill apposition of words, and the Hoover pungency of occasional phrase. His 1930 president's address, previously noted, is an early example. His "What Plan Shall We Pursue concerning Physical Defects in the General Population," presented in 1943, is a later one. In between is his characterzation of certain political philosophies of the last 16 years as "idealistic conceptions fostered by sub-standard mentalities." The solid impact of his presentations is well illustrated by a lecture he gave at a Long Island College Postgraduate Course in Industrial Medicine. This was entitled "Factors Affecting Industrial Health" (see INDUSTRIAL MEDICINE, 10:9, 403-410, September, 1941). So thoroughly was his subject covered that little has remained for subsequent analysis except elaborations of detail. Like Churchill, he is a conservative; like Hoover, a Republican. And, again like both, he knows his country's history—particularly as to the Colonial and Revolutionary periods—as thoroughly as if he were historian, and is fer-

vently devoted to its institutions. The resemblance goes also to temperament, and some of his friends would include appearance—the strong features, the sturdy build. His is "a grave and manly deportment, a solemn dignity of mien, but which, upon a nearer acquaintance, softens into an engaging easiness of manner." He has the forthrightness and honesty of Hoover, and the substantial charm of Churchill, without his asperity. Photogenically he seems usually a bit austere, but his smile and kindly eyes belie the sternness. Unexpectedly, he has a neat, but very tolerant, sense of humor.

THE year 1930 had a special significance for A.T.&T. employees. On January 1 the Benefit plan was amended, the vice-president in charge of personnel relations took over its administration, and retirement on pension at age 65 was made compulsory for everyone on the payroll. The company had been contributing 10 million a year to the Benefit Fund; in the 35 years since the plan was inaugurated the company as of today has paid out a billion dollars in pensions. The medical department became an arm of personnel; and DR. WATSON had to look forward to a successor in 1943. But that was 13 years away—a long time. They were 13 busy years . . . .

After his term as AAIP&S president he continued to participate in the affairs of the Association, and contributed much to its meetings and to the work of its committees. He had long been interested in first aid and safety—in fact this interest started with his first injury case in 1908. Later the increasing number of accidents when the telephone companies began transferring their lines from overhead to underground led him into the intensive study of means of prevention. Thus he came in contact with safety movements and safety people. He was already a licensed examiner and instructor in the First Aid Division of National Red Cross. Identified from the start with the purposes and aims of the National Safety Council, he attended its Congresses, met its leaders, and developed a close relationship with its headquarters organization. After a while he was asked to take the vice-presidency for health, succeeding DR. C-E. A. WINSLOW. Later he was president, 1935-'37, and since he has been continuously a member of the Executive Committee. Regarding his official connection with the Safety Council, he says that his principal usefulness, "if such it can be called," was in the "debunking" of various safety techniques. He took it seriously, however, and gave it so much of his time that he had to relinquish an association he valued highly—with the Y.M.C.A., where for many years he had done the medical work for the Board of Certification for Secretaryships.

The range and variety of the subjects to which his restlessness of mind and persuasions of heart gave attention during this busy period can be indicated through a summary of his professional identifications. In addition to AAIP&S, and the Conference Board of Physicians in Industry, his medical memberships included A.M.A., and the New York and King's County Medical Societies; his Fellowships, the New York Academy of Medicine, and the American College of Surgeons. In the latter he was a member of the Committee on Fractures. He was active in the work of the National Tuberculosis Association, the New York Heart Association, the Committee on Prevention of Silicosis Through Medical Control, and the Committee on Research Problems of Alcohol. In the public affairs of the state, he was advisory member of the Poole Committee on the State Compensation Law, a member of the Economic Committee of the State Medical Society, and medical adviser of the New York War Manpower Commission. On the national scene he was a member of the War Committee of the American Standards Association, and of the N.A.M. Advisory Committee on Healthful Working Conditions. In New York City he belonged to the American Museum of Natural History, and for some time he has been a member of the New York Park Commission. He is a member of the Medical Board of the Presbyterian Hospital, and a Trustee of the Long Island College of Medicine, where for many years he was Clinical Professor of Medicine.

None of these identifications was honorary; his appointments came to him because of himself, and always his presence added an element of strength and solidity to the matter in hand. He was not a "joiner," not much of a mixer, but he had legions of acquaintances and hosts of friends in every walk and on every level of life, from the very important to the very unimportant. He attracted liking, and inspired respect. Almost judicial in judgment, his opinions were not lightly given, nor quickly altered; and his attachments, both to people and to causes, were always firm. His mental application was tremendous, and his capacity for work something to be envied—particularly in respect of his faculty for instant selection of and concentration upon the part of it that was vital to the doing. When he got interested in an objective, the details marshalled themselves behind him and quietly followed along.

Out of order in chronology, but interesting as his one venture into business, was his participation in the original group that founded the surgical supply house of Davis & Geck many years ago. It was at his suggestion that this company's famous incunabula publications were begun. These were copies of the old wood cuts showing sutures, made by photographing posed models. They won a Harvard award for artistic excellence.

IF SO MUCH of this sketch is in the past tense it is for the reason that in 1943 this man's career in industrial medicine came to pause. September 13 was his 65th birthday, and he was due for retirement. He was succeeded as medical director of American Telephone and Telegraph Company by DR. MELVILLE H. MANSON. Immediately

he took over the directorship of Vanderbilt Clinic, the outpatient department for the voluntary hospitals of the Columbia-Presbyterian Medical Center. Here his administrative duties coordinated the work of several hundred physicians and surgeons and more than 500 lay and technical assistants, caring for 300,000 patients a year. For two and a half years, he put into this all he had—which was a very great deal—of energy and ability. With the war's end in 1945, he was ready to ease up a bit, and he gave it over, purchased and a little modernized a beautiful Colonial house at Brookfield Center, near Danbury, Connecticut, and, with the gracious lady who since 1908 has been MRS. WATSON, went back to the area of his forebears.

Once more like Churchill, he has become something of an artist with brush and colors. Always adept at drawing, he now paints—mostly New England landscapes; some are really superior. He has long been an authority on New England flora—perhaps it should have been mentioned that he was laboratory assistant in botany at the University of Pennsylvania, 1897-1901. He has innumerable Kodachrome slides of native wildflowers, many of which he transplants to his garden. It is related that when he learned several years ago of a botanist at one of the museums in New York who was writing a book on the wildflowers of the north-eastern states, he sent him, as a matter of interest and aid, several dozen slides of the most rare and unusual ones. In due time these were acknowledged with thanks, and the question, "But what *are* they?"

AT THE time of his retirement as medical director of A.T. & T., DR. WATSON was given a beautifully-bound book in which the signatures of more than 700 of the officers, directors and employees of the company, headed by WALTER GIFFORD, filled the pages following a memorial reading in part as follows: "For these things, then, we are grateful to you: for long years of service, devotedly performed; for the sureness of professional skill and judgment with which you have watched over the health of thousands of people engaged in an important public enterprise; for the pride we share in your professional attainments in wide fields; for your broad experience with life, ripened into a rich philosophy that has made us and others seek your advice on problems lying far beyond the bounds of your activities as a physician; for your chuckling sense of humor, which has made many hearts lighter and never given hurt to one; for the warmth of your handclasp, silently speaking sympathy and understanding, when these have been needed, and always expressing a friendship with deep-laid foundations. In short, we thank you for yourself, as we have come to know you through the years. And with our thanks, we give you all that our hearts can hold of good wishes for the years that are to come."

IT IS difficult to draw CASSIUS WATSON in profile. One needs three dimensions to describe the facets of his personality, a fourth to collect the nuances. This man and his career are book size. The chronicle of his life, in its rich detail of intimate contacts with important men and great events during the critical half-century since his college days, would be a priceless addition to the contemporary picture. His years in industrial medicine have their own recognized fixed and unchangeable place in the history and development of the science to which they were dedicated. But they have another significance, for he was endowed with the qualities and favored with the opportunity which, in their time together, quietly wove industrial medicine firmly and indelibly into the fabric of the national life.

The arena of his activities is narrower now, but all that he was he is—a great, kindly, intellectual, myriad-minded, human-hearted, restless "bear of a man," warmly interested in men and in medicine, keenly alert to all that is going on. One takes leave of him with the conviction of having visited industrial medicine's elder statesman.

JOHNSON AND JOHNSON are sponsoring a new radio series in which the patients, via tape-recorded interviews, will talk frankly about their past and present illnesses. Entitled "It's Your Life," the program will be heard at 11:15-11:30 A.M., and will continue Monday through Friday for 13 weeks starting Monday, October 18. The series is controlled and will be produced by the Chicago Industrial Health Association, which consists of about 30 professional and health agencies in that city. DR. FREDERICK W. SLOBE is chairman of the Association's executive council. If the program is successful, the sponsor plans to continue it on evening time and to extend it to other stations, with the possibility of a national hook-up later.

ASSOCIATION NEWS

1949 Conference, Detroit

THE 34TH ANNUAL MEETING and Industrial Health Conference, sponsored by the AAIP&S in conjunction with four other participating organizations, is announced.

The Conference will be held in Detroit, Michigan, April 2-8, 1949, with headquarters at the Book-Cadillac and Statler Hotels.

The dates of the meetings for the various participating groups are as follows:

April 2-5, 1949, American Conference of Governmental Industrial Hygienists.
April 5-8, 1949, American Association of Industrial Physicians and Surgeons.
April 5-7, 1949, American Industrial Hygiene Association.
April 6-7, 1949, American Association of Industrial Dentists.
(To be announced in October) American Association of Industrial Nurses.

April 5-8: AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS.
April 2-5: AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS.
April 5-7: AMERICAN INDUSTRIAL HYGIENE ASSOCIATION.
April : AMERICAN ASSOCIATION OF INDUSTRIAL NURSES.
April 6-7: AMERICAN ASSOCIATION OF INDUSTRIAL DENTISTS.

To assist those attending the Detroit Industrial Health Conference to obtain hotel rooms, a Hotel Reservation Committee has been set up. This Committee has reserved rooms at the hotels listed below.

To apply for a room, please:

1. Fill in on the reservation blank below your first, second, third and fourth choice hotel, selected from the list of hotels.
2. Since doubling up may be required, indicate with whom you will share your room. Otherwise, a roommate may be assigned to you.
3. State your arrival and departure date and time and sign your name and address.
4. *Mail it to the hotel of your first choice.*

If the hotel of your first choice is able to accommodate you, it will confirm your reservation immediately. If not, it will pass your application along to the Hotel Reservations Committee which will try to assign you to the hotel of your second choice. If the hotel of your second choice is full, the Committee will try your third choice, and so on until you are assigned.

Your cooperation in canceling reservations immediately in the event of a change in plans, will be greatly appreciated. Should there be any change in the time of arrival, be sure to wire or telephone the Assistant Manager as reservations will only be held until 6:00 P.M.

Apply for your room now by sending in the following application to the hotel of your first choice.

Please make the following hotel reservations for the 1949 convention:

Type of Reservation desired:

Single Room_____ Double Bedded Room_____ Twin Bedded Room_____

Rate: From $_____ to $_____

Date of Arrival: _____ Time: _____ A.M. _____ P.M.

Time of Departure: _____ Time: _____ A.M. _____ P.M.

Names and addresses of persons to occupy these Reservations:

_____ _____

First Choice Hotel: _____ Signed: _____

Second Choice Hotel: _____

Third Choice Hotel: _____ Address: _____

Fourth Choice Hotel: _____ City _____ State _____

Detroit Hotels

Co-Headquarters Hotels		RATES *Single*	*Double*	*Twin*
BOOK-CADILLAC,	1114 Washington Blvd.	$4.00 up	$6.00 up	$7.00 up
STATLER,	1539 Washington Blvd.	3.50 up	6.50 up	8.00 up
Other Hotels in Order of Convenience to Headquarters Hotels:				
FORT SHELBY,	525 W. Lafayette	3.50 up	6.00 up	6.00 up
DETROIT LELAND,	1701 Cass Avenue	3.50 up	6.00 up	7.00 up
TULLER,	521 Park Avenue	3.00 up	5.00 up	6.00 up
IMPERIAL,	26 Peterboro Street	3.75 up	4.75 up	6.00 up
WOLVERINE,	50 E. Elizabeth	3.00 up	5.50 up	7.00 up
NORTON,	410 Griswold Street	2.00 up	3.75 up	4.50 up
STRATHMORE,	70 W. Alexandrine	2.25 up	4.50 up	5.00 up
THE SHERATON,	15 E. Kirby Street	4.00 up	6.50 up	6.50 up
THE BELCREST,	5440 Cass Avenue	4.50 up	6.00 up	6.00 up
PARK AVENUE,	2643 Park Avenue	2.50 up	5.00 up	5.00 up
THE WHITTIER,	415 Burns Drive	6.00 up	7.50 up	7.50 up
THE ABINGTON,	700 Seward Avenue	3.50 up	5.00 up	5.00 up
LEE PLAZA APT. HOTEL,	2240 W. Grand Blvd.	4.50 up	6.00 up	6.50 up
NORTON PALMER,	Windsor, Ontario	2.25 up	5.00 up	6.00 up
PRINCE EDWARD,	Windsor, Ontario	3.50 up	4.00 up	5.00 up

NEWS, COMMENT, OPINION

Industrial Health Progress

BIRMINGHAM'S industrial plants are vitally concerned with the health of their employees. It is good business to make certain, so far as possible, that workers and executives remain healthy. But more than that fact, employers are anxious to do whatever they can to maintain high standards of health for the whole community for human as well as economic reasons. The Birmingham Industrial Health Council was founded early in 1947. Its membership in the beginning comprised nine firms, but in less than a year and a half it has increased to 78, representing many of the outstanding commercial and industrial enterprises of Birmingham and Jefferson County. According to reports of individual firms, the educational and service program of the council has supplied a very definite need in the health picture of the whole community. A survey conducted on a national scale, in which 278 firms in 33 states cooperated, indicates that the results of an industrial health program are earlier control of disability, better control of medical, hospital and insurance expenses, lower compensation payments, and higher production efficiency. These are goals toward which each employer strives. Further, they are goals which, when achieved, are for the benefit of all society. A high percentage of firms employing large forces has long been active in the care of physical and mental illnesses among the employees. There is still a very wide field for advancement among smaller concerns, however. The war, however, speeded industrial health progress in companies of all sizes, with outstanding examples of health protection shown by munitions plants. Per capita cost of industrial health work amounts to between $10 and $12 annually in most plants. Whatever is spent by companies in the field is generally regarded as money well invested. American productive capacity is now responsible for about 50% of the world's goods. Conservation of manpower and reduction of losses due to injury and sickness are serious problems. Six million man days of loss of production per year present a staggering figure. In Birmingham alone it is estimated that $10,200,000 is the cost of illness either directly or indirectly felt by our firms. Much of it comes from non-occupational diseases which may be controlled in large part by sensible measures that can be promoted by the Industrial Health Council. The local council has issued a pamphlet called "—About a Guy Named Bill," which brings to the executive's desk pictorial evidence of the cost of illness in Birmingham's industrial life. In the average year each worker spends 10 days away from his job because of sickness. There are other days when he tries to work but finds himself below par physically or mentally and thus lowers his standard of production or is more likely to be injured because of carelessness or slowness in performing his duties. The tools which the employer can use in helping to reduce sickness and accident rates are medical science and an enlarged public health program. By cooperating with medical men and public health officials, the employer can exert leadership which will reduce his production costs, maintin better health standards in the community and thus among his workers, and so save money in the long run. The work of the Birmingham Industrial Health Council is primarily educational.

—*Birmingham, Alabama News*, August 7, 1948.

In Terms of Understanding

HIPPOCRATES says that of all professions that of medicine is the most distinguished since it aims not only to heal the body but also to calm the mind and spirit. This truth the country doctors of the Maine coast, and elsewhere, of course, understood well. They had never heard of psychiatry, but they knew people, their families, their circumstances, and their worries, and they seemingly had all the time in the world to "talk things over" with their patients. Dr. Rufus Grindle often brought books along, which he thought his patients might enjoy, and, while his old white horse often got tired of waiting and ambled home without him, he might be playing a game of checkers with someone not long for this world. Money never seemed to worry either of our doctors. They cheerfully took their pay, if necessary, in potatoes, lobsters, or a day's labor in their gardens or at their woodpiles. In terms of affection and understanding, as well as of healing, they cared for their patients.

—From "The Country Doctor on the Maine Coast," by MARY ELLEN CHASE, PH.D., in *New England J. Med.*, August 19, 1948.

The Issue is Birth Control

AN Indianapolis obstetrician has become the center of a controversy in which he has been lauded by some medics and accused of "Godless philosophy" by others. The issue is birth control. Dr. C. O. McCormick touched it off with an article in the *Journal of the Indiana State Medical Association* when he told doctors that "control of the birth rate is more important than control of the atomic bomb." The report inspired pro and con response throughout the state until the Journal removed itself as the battleground and said it would consider the argument closed. But it has spilled over into non-medical circles and Dr. McCormick is in demand as a luncheon speaker and on the receiving end of critical lay letters. "Reckless breeding is strangely like social cancer," Dr. McCormick contends. "Surplus human beings eat away all of us. Already one may seriously wonder if we have not done too little and come too late." He argues that overpopulation is basically the cause of war, famine, pestilence, undernourishment and unsanitary conditions. Uncontrolled breeding, he insists, favors the survival and multiplying of the least gifted. Criminal abortions of unwanted pregnancies are responsible, he says, for one-sixth of all maternal deaths. He adds that at least one million conceptions a year are aborted, that 60% are intentionally incurred and that 90% are performed on married women. A leading spokesman for the opposition is Dr. F. A. Streck, of Lawrenceburn, Indiana. He declares: "Can it be that men who have accomplished veritable miracles in the production of machinery, who have split the atom, will be unable by diligent study to devise maens to provide the essentials of life to an increasing population. I do not think so. I have too much faith in God and in man." The issue, Dr. Streck asserts, is not a medical but a moral one. "We need humble prayer—not planned parenthood."

—ARTHUR J. SNYDER, Staff Science Writer, in *Chicago Daily News*, August 17, 1948.

BOOK REVIEW

OCCUPATIONAL MARKS AND OTHER PHYSICAL SIGNS, by FRANCESCO RONCHESE, M.D., Instructor in Dermatology, Boston University School of Medicine; Dermatologist in Chief, Rhode Island Hospital, Providence. GRUNE & STRATTON, New York, 1948; 181 pp., with 153 illustrations. Price, $5.50.

THE romance of medicine is not limited to gigantic achievements, as the banishment of cholera, the creation of typhoid fever vaccine, the discovery of insulin. The picturesque in medicine is everywhere. This author, although writing in forthright scientific fashion, has captured and recorded the romance in and behind the telltale markings branded by work on to the bodies of plyers of a legion of trades. For the few, this book merely will serve as the guide in diagnosis and identification. For those with wider angles of vision, this book will be many more things —a portrait gallery, a history of toil, a mirror of some trade practices, an invitation to wider concepts of industrial hygiene.

The flavor of this book is forecast in its opening passage: "Comel, in the preface to his treatise on the physiopathology of the human skin, with the deep thinking of a philosopher and the lyricism of a renaissance writer, calls the skin the monumental facade of the human body, telling the age, the peaceful or calamitous past, the effeminate or virile character, the constitution, etc., of its bearer."

The more substantial portion of the book is divided into six categories—General Aspects, Scientific Occupational Markings, Professional Markings, Body Areas and Distinctive Markings, Deceptive Markings and Legal Problems, and Classification of Markings. Within this grouping, emphasis is directed to specific occupational markings. Two-thirds of the publication consist of illustrations with unique features. Every photograph of the disease entity or occupational marking is accompanied by pen and ink drawing depicting the manner through which the marking was acquired. Through text or picture, the reader is introduced to scores of characteristic physical signs such as may identify the florist, the barber, the tailor, the carpenter, the caulker, the plasterer, the hod carrier, the lathe worker, the hatter, the bellboy, the ticket stamper, the iron worker, the elevator operator. Here and there the author introduces the unexpected, such as historical reference to the well-damaged hands of the ant egg collector—the injury arising from formic acid. Ant eggs were much in demand at an earlier period for the feeding of pheasant and quail, just as they are now for the feeding of goldfish and turtle. Again, this author, with reference to dermatitis *ab igne* (dermatitis from fire), recognizes that most physicians are familiar with that affection on the extremities of many classes of workers and many nonworkers; he observes that dermatitis *ab igne* may arise on the face in such work as jewelry making.

The author aligns his chief concern with "diagnosis and personal identification." "Prevention" is submerged or subordinated. This is a happy occurrence since the stimulated reader is not frustrated by completeness or pre-emption. The author, notwithstanding his own contribution, is an opener of doors for further exploration in the realm of "Occupational Marks." —CAREY P. MCCORD, M.D.

LETTERS

The Practicing Physician and Diabetes Detection

TO THE EDITOR: The discovery and treatment of diabetes mellitus at an early stage demand the attention of all practicing physicians. Failure to discover and treat diabetes early results in preventable disabilities and impairments of health. In the Diabetes Exhibit at the Annual Meeting of the American Medical Association held in Chicago in June, 1948, it was shown that the mortality rate for diabetics first seen when a complication occurred was three times the rate for diabetics first seen earlier and before impairments had developed. Actually the future for the diabetic patient under modern medical treatment is brighter and more hopeful today than ever before.

In 1929, Dr. George H. Gigelow and Dr. Herbert Lombard began a study of chronic disease in Massachusetts which led to the publication of statistics showing that the number of diabetic patients in Massachusetts was far higher than had been heretofore thought. In 1935, a National Health Survey was conducted which confirmed these figures. In Oxford, Massachusetts results of a survey by the U. S. Public Health Service indicate at least a million undiagnosed diabetics in the U. S. and Canada.

As a first step in a full-scale attack on diabetes, eighth among the leading causes of death, a medical society should appoint its committee on diabetes. The national Committee on Diabetes Detection stands ready to assist local committees in their work. Already the Committee is preparing material containing information on diabetes for use by the physician in his own town. These materials include programs for medical meetings, radio broadcasts and spot radio announcements for use by city and county medical societies, and suggestions for cooperation with local hospitals.

The Committees on Post-Graduate Instruction in State and County societies should plan instruction and demonstrations in diabetes in county meetings this fall. Also, hospital staff meetings should provide a place on their program for diabetes. Committees on Public Relations and Public Information should plan meetings for instruction of laymen, including patients, their families, and others.

Women too, have an important role to play in the fight to control diabetes. It is significant that among women, diabetes is more frequent than among men. It is desirable to enlist the aid of women's organizations, especially the women's auxiliaries of the medical societies, as an adjunct to the program planned by medical societies.

Already a number of local diabetes associations affiliated with the American Diabetes Association have been formed. More such associations composed of physicians are needed. With the cooperation of the physicians within their area these associations have accepted the challenge and will strive to find and treat the million hidden diabetics. Associations will be assisted by the American Diabetes Association in attaining such objectives as: more graduate courses in diabetes for physicians; providing better laboratory services; and helping with instruction for patients. Now is the time for action. . . .

—HOWARD F. ROOT, Chairman,
Committee on Diabetes Detection,
81 Bay State Road, Boston.

INDUSTRIAL MEDICINE

EXECUTIVE, EDITORIAL, AND PUBLICATION OFFICES: 605 NORTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

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ESTABLISHED 1932

Publisher: A. D. CLOUD

Volume 17 OCTOBER 1948 *Number 10*

"Somatic Disturbances from Mental Impositions"

DR. McCORD says of his "Life and Death by the Minute" (page 377) that "foremostly it was addressed to the public." Implicit for the medical profession are the "enormous indications of somatic disturbances from mental impositions." Such disturbances are recognized as having a growing importance in industrial medicine. They are common in the work environment. There, they are mostly subjective; the worker brings them with him when he comes to work. Sometimes, and in various degrees, they are inherent in the job. In the one here they reach the *nth* power of objectivity—the extreme opposite of the monotony of assembly-line operation—an intensity of mental effort *on the high plateau of constant maximum strain.* The utmost is required to keep things going right; still more is needed when they go wrong.

There is drama in this terrific impact of the job on the men who do it. They do it "at a price"—"the whole man," the burned-out body, the shortened life. A "low obeisance" to these unhonored workers is suggested by the author. This, if given, is about all the tribute they'll get.

A New Pattern

COOPERATIVE regional meetings have usually taken the form of gatherings sponsored by industrial physicians and surgeons and inviting other organized groups; meetings sponsored by local industrial nurses' groups, to which other types of personnel are invited, and variations on this original theme. Our national meetings, of course, embrace the national organizations of industrial physicians and surgeons, industrial hygienists, industrial nurses, governmental hygienists, and industrial dentists.

An October meeting recently announced (in the August, 1948, issue of INDUSTRIAL NURSING) is described as follows: "Three of New Jersey's Industrial Health Groups will hold a dinner conference on October 9, afternoon and evening at Military Park Hotel, Newark, New Jersey. The co-sponsors are the NEW JERSEY ASSOCIATION OF INDUSTRIAL PHYSICIANS, A. F. MANGELSDORFF, M.D., President; the New Jersey Section of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, MR. E. L. SCHALL, Chairman; and the New Jersey Industrial Nurses' Association, MRS. LENA LYONS, R.N., President."

Here is a new pattern for local and regional meetings, which could well be followed by many similar organizations in order to get better attendance, heightened community of interest, and a broader exchange of ideas which would be mutually beneficial. This is a principle which should receive more consideration and greater application, to strengthen the industrial groups of various types of personnel at the very "grass roots" of their growth.

On the National Scene

THE report to the President by the Federal Security Administrator concerning the state of the nation's health is an expensively produced book of 186 pages. The National Health Assembly which met in Washington, May 1-4, is credited with being "extremely helpful." On casual reading this report may seem more fair than it is. Inspection reveals the usual propaganda. Thus the time-worn and untrue statement that the "5,000,000 men declared unfit physically or mentally for the armed services" are among those whom "national health insurance" would render fit. And the complete absence of explanation regarding the cost of lay administration or the number of government employees to be engaged in it—no promise that there won't be, as was the case in Germany, "four bureaucrats for every three doctors." One instance of the logic is on page 9 of the report. As to the number of lives that could be prolonged by the so-called "insurance," the text reads: "Similarly, of

the 100,000 deaths yearly from accidents, the fuller use of safety measures and better education should permit us to save perhaps 40,000.... These are some of the lives we could save if we were able today to assure everyone in the country that he would be able to receive the health and medical services that he needs." This is a new angle on safety. The President asked for this report. He got it—in form and content to agree with his own expressed ideas....

Under the Railroad Retirement Board's sickness benefits program, "an estimated $943,000 was paid to 5,800 Chicago region railroad workers in the year ended June 30," the first year under the plan. "In most cases the payments were $4.50 to $5.00 a day." Some have criticized this railroad program as a form of "socialized medicine"—government-paid benefits. Possibly it is, but $5.00 a day to a sick train dispatcher seems little enough....

The Democratic candidate for the governorship of Illinois promises: "the Industrial Commission is going to be conducted for the benefit of employer and employee alike and not for the benefit of politicians." Then he appeals for votes with this: "Benefits under the Workmen's Compensation Act should be increased." This appeal, of course, is not for the benefit of any politician!

Perhaps it would be well to go to the polls on November 2 with the train dispatchers in mind in this connection. If our public servants worked as devotedly to maintain our liberties as these railroad men work to preserve our safety, we could face tomorrow with confidence instead of trepidation.

Workmen's Compensation

WHEN Milton's "Paradise Lost" was first published the critics voiced the opinion: "Unless length has merit, this has none." Without comparisons, BERT HANMAN'S "Occupational Incapacity" (page 383) should be measured in dimensions of thought rather than of substance. Too much for an article, too little for a book, it occupies the mid-position because it is forced to do so. Shorter, for the digest-minded reader, it would waver between cataloging the points it makes, and omitting them. Longer, to discuss the reader's favorite approach—"personality," "opinion testimony," "labor's view," "management's responsibility," etc.—it might confirm the very patch-work which it finds impossible to reduce to order. The author says: "....the first half proves that the present system cannot be repaired. I know of no such proof having been offered to date. Yet some (see page 402) would like to omit the first half and present only the speculative second part. But that, although establishing a newer and sounder philosophic base, gives no real answers. It gives indications to be explored. Research is necessary, but only an understanding of the situation presented in the first half will establish the need as developed in the second....for the serious-minded, the article drops a pebble, at least, into the stagnant pool of workmen's compensation." We would add that if the article should be considered a very large pebble, it must be remembered that it is being dropped into a very large pool. And the dropping is timely—from the medicolegal standpoint alone there is a creeping overflow, submerging the injured man's interests in a welter of conflict and complexity which, as it progresses, is likely to develop little more than an increased number of professional beachcombers.

First Fellowship

THE American Foundation of Occupational Health announces its first Fellowship for post-graduate training in occupational medicine (see page 404). This is an important event for the Foundation, and another milestone on the way to certification of the specialty. Fellowships in industrial medicine have already been established at the University of Pittsburgh School of Medicine under DR. T. LYLE HAZLETT, and at the Medical College of the University of Cincinnati under DR. ROBERT A. KEHOE. The Institute of Medicine at New York University Medical School, under the directorship of DR. ANTHONY J. LANZA, has a graduate training program in process; and DR. RAYMOND HUSSEY, at Wayne University in Detroit, is working toward the same end. General Motors, through several medical schools, has set up a number of short graduate Fellowships. When there are enough of these, under standards developed by the Advisory Board of Medical Specialties, certification in industrial medicine will become a fact. The Foundation of Occupational Health is aiming toward more such Fellowships, on a basis comparable with those existing in the specialties which have Certification Boards.

It is noteworthy that the graduates of the now existing Fellowships have all received interesting and worthwhile appointments as medical directors. The demand for competent, well-trained industrial physicians far exceeds the supply.

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- ... prolongs relief, reducing possible infection from scratching.

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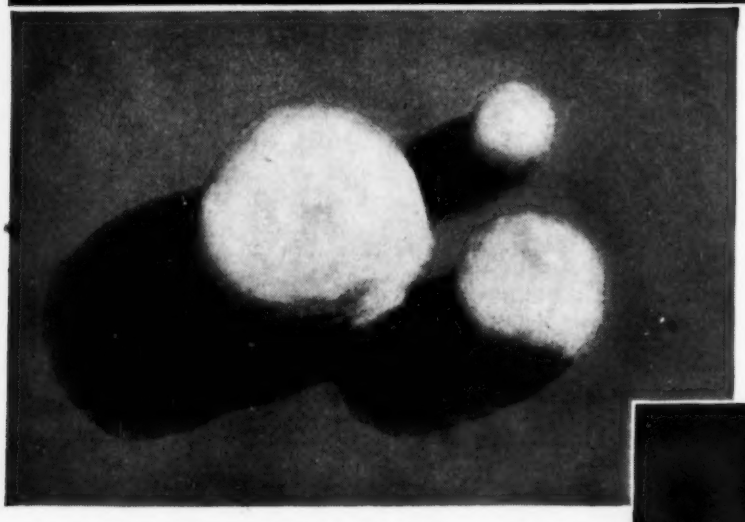

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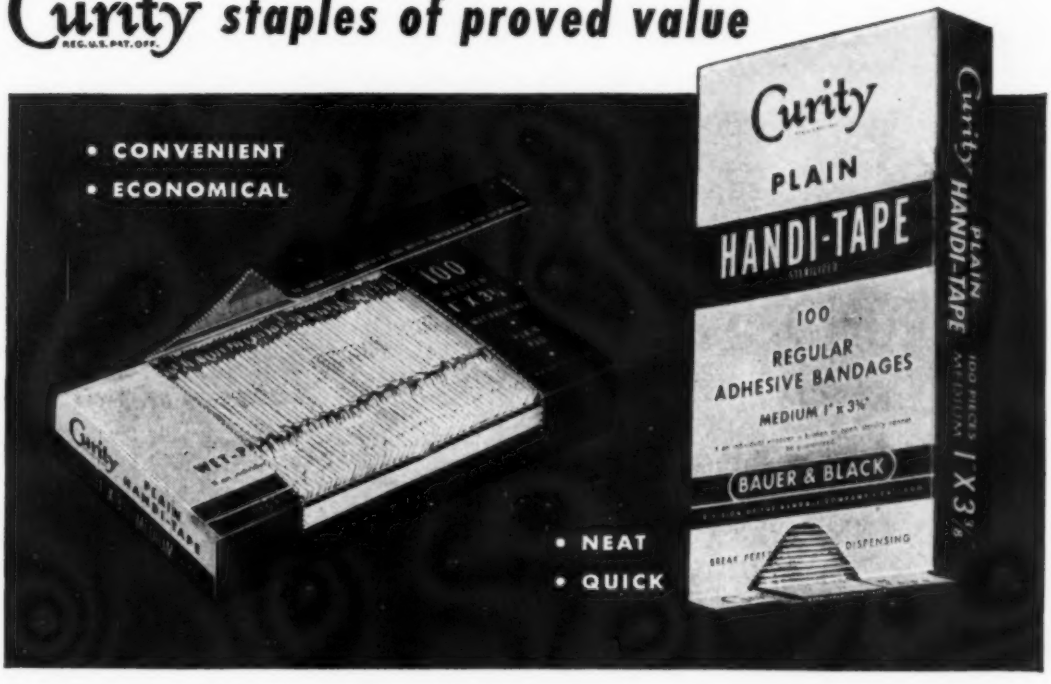

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RESEARCH TO IMPROVE TECHNIC...TO REDUCE COST

INDUSTRIAL HEALTH and DISEASE

THE Ninth Annual Meeting of the Ambulatory Fracture Association "For the Study of Skeletal Pinning and External Fixation," is being held October 4-6, 1948, at the Mayflower Hotel, Washington, D. C.

Medical Services Expanding

EVIDENCE that the scope of company medical services has "expanded widely" during the last few years is contained in a survey of industrial health and medical programs released by the National Industrial Conference Board. Pre-placement physical examinations for hourly workers are required by more than 90% of the 333 establishments surveyed. Examinations are also compulsory for office workers in 76.9% of the companies studied; for supervisors in 74.8% and for executives in 58.9%. Both large and small companies provide pre-placement and periodic physical examinations and counseling services for supervisors and executives. In most cases, all the examinations are provided without cost to members of the two groups. Many of the smaller companies utilize the part-time services of physicians, visiting nurse services and community facilities to provide their employees with many of the health services available in larger companies. Industrial hygiene programs are maintained by 47.4% of the cooperating establishments, it was found. Many health problems, occupational diseases and hazards are reported as being decreased through the analysis and control of working conditions and environments, such as fumes, lighting, dust, sanitation and temperature. Health education programs also are being used by many of the companies surveyed "to keep employees and their families informed on current health data," the board said. Employee publications, health bulletins, posters, motion pictures and personal interviews are some of the media reported being used for the purpose.

—*New York Times*, September 7, 1948.

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Theory on Ulcer Cause

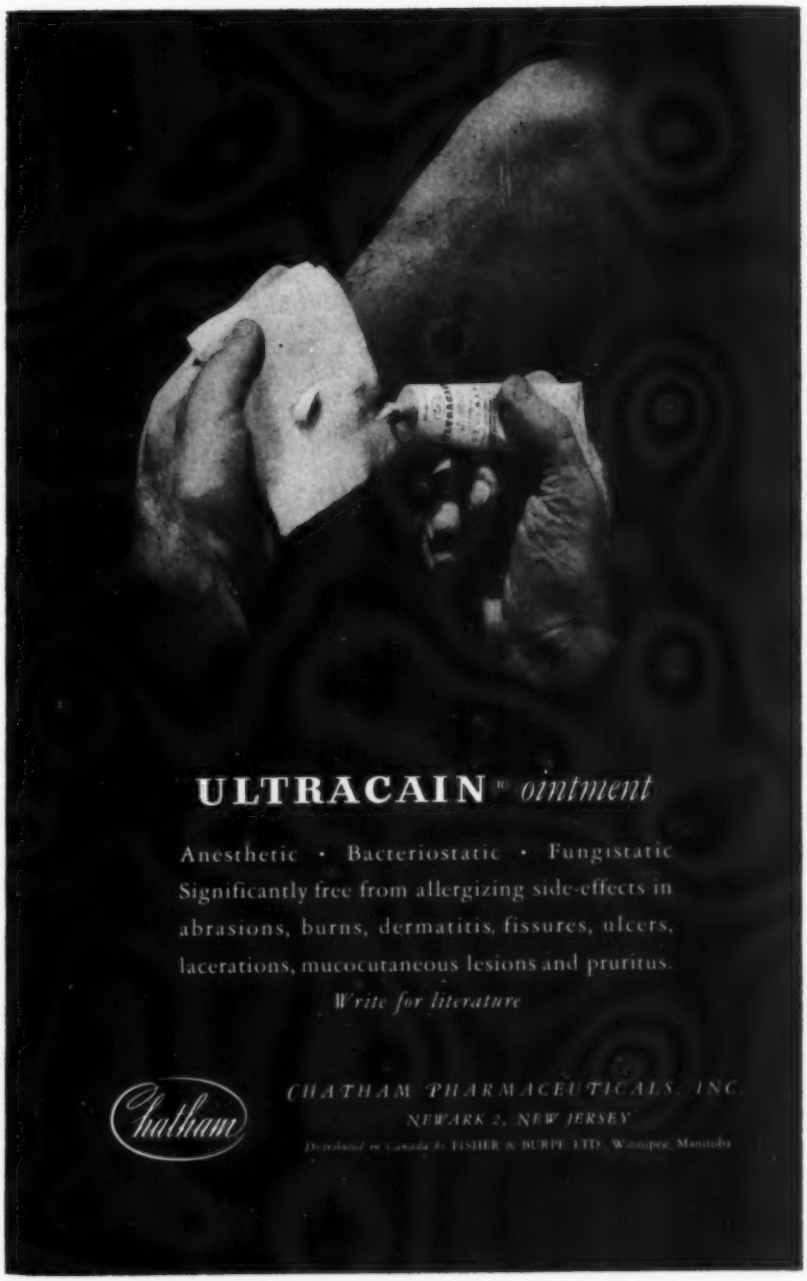
THE theory that ulcers are primarily caused by pressure of the liver on the stomach and duodenum is advanced by DR. DONALD COOK, Chicago physician. His belief is presented in a book issued by the Medical Center Publications in cooperation with Medical Center Foundation and Fund, Chicago. He contends that ulcers occur most frequently in persons whose occupation compels them to bend the body forward. Smoking or coffee have little effect on the incidence of ulcers, DR. COOK believes. Food allergy may act as a secondary cause.

—News Item.

Graduate Course

THE INSTITUTE of Industrial Medicine, a unit of

the New York University-Bellevue Medical Center, this fall will inaugurate a graduate course in industrial medicine, in cooperation with the College of Engineering, of New York University. Catalogs outlining the aims of the Institute, coupled with detailed announcement of the combined course for graduate physicians and engineers, are now being mailed to leading institutions and industrial hygiene authorities taroughout the country. The one-year course is divided into eight to nine months of intramural study, and three to four months of in-plant experience. The announcement reveals that the two professions—medicine and engineering—have been joined into an industrial health teaching program. "The phase that deals with the workers falls largely within the field of medicine, whereas the study and supervision of environmental conditions in their relation to health fall within the field of engineering," DR. ANTHONY J. LANZA, chairman of the Institute explained. Inauguration of the graduate course of instruction follows the establishment last year of an undergraduate course for third-year students in the College of Medicine, simultaneously with the setting up of the Laboratory of Industrial Toxicology, the first of three units devoted exclusively to research in industrial hygiene problems. Laboratories of Industrial Hygiene and Industrial Physiology are expected soon to be established.



Research Laboratory

INDUSTRIAL Hygiene Foundation, Pittsburgh, has arranged with the Elizabeth Steel Magee Hospital, part of the University of Pittsburgh Medical Center, to occupy a laboratory building providing facilities for expansion of the Foundation's basic researches in industrial health. It is proposed to develop an organization for the primary use of the members along the following lines: (1) toxicologic studies, (2) research in industrial hygiene methods along the line of development of new instruments, method of analysis, and procedures for use in practical field work, and (3) engineering research under controlled laboratory conditions, such as air cleaning methods and ventilation requirements.

Absences

NEARLY two-thirds of all explained work absences reported during the first half of 1947 were ascribed to illness or accidents not related to employment, according to a survey made jointly by the Social Security Administration, the U.S. Public Health Service, and the Bureau of Labor Statistics. The survey covered 260 manufacturing plants employing about 160,000 workers. Expressed on an annual basis, the record for the first two quarters indicated an over-all average of 3.3 and 3.4 absences per year per employee. Each worker averaged nearly two absences per year because of illness or non-occupational accidents. In the first quarter, the workers of the reporting plants lost time at an annual rate of 10.7 days per worker employed. In the second quarter less time was lost because of illness, and the rate of loss dropped to 9.0 days per year. More than half of the time

lost in each quarter was ascribed to sickness or injury from non-work accidents. In the first quarter the rate of time loss for these reasons was 6.5 days per worker per year. In the second quarter this rate fell to 4.9 days per worker per year. The rate of absenteeism for women was about half again as high as the rate for men. In the two quarters, the annual time-loss rates for men were 9.3 and 8.3 days per worker. For women the corresponding averages were 13.1 and 12.5. This difference was most pronounced in respect to the time lost because of illness or non-work injuries. For men the annual rate of time loss for these reasons was 5.6 days per worker during the first quarter, and 4.1 in the second quarter. For women the rates were 8.2 and 7.4. The average time lost by women for personal reasons also exceeded that for men in each quarter. Approximately half of the illness absences for which the duration was reported were terminated after only one day, and fully three-fourths of the total were terminated in less than four days. Less than 10% of the absences chargeable to illness involved disabilities lasting as long as eight days.

—*Storebuilder*, Washington, D. C.

Averages

WHILE all of us more or less have to rely on average figures to draw comparisons and conclusions, sometimes averages are very dangerous. For example, most of us have heard about the chap who was drowned in a river which only averaged two feet in depth. Then, too, I will always remember the remark my dad made to me many years ago about the wealth of the people living on the same street we did. He asked me if I knew that the average wealth per family was greater on our street than on any other street in the State of Pennsylvania. I told him no—that I hadn't even thought about it. He said well it was true—it averaged $1,000,000 per family. Well, this bothered me as I knew Dad was renting his home and working for a daily wage, and I knew most of the others were too. But Dad quickly came up with the answer. He said that there were six families living on the street —but the family living on the corner had $6,000,000.

—From an address by J. R. DAVIS, Vice-President, Ford Motor Company.

Diagnostic Tests for Cancer

A WIDE variety of diagnostic tests to detect cancer in its early, curable stages will be screened and, where the evidence warrants, will be given a mass tryout through a cooperative program just announced by Dr. J. R. Heller, Director of the National Cancer Institute of the Public Health Service, Federal Security Agency. The new program calls for a concerted drive by NCI scientists and a group of cooperating medical schools and hospitals to determine which of the many reported diagnostic tests for cancer are dependable and simple enough for widespread use, to refine the most promising tests, and to develop original ones.

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Alcoholic Research

AN ALCOHOLIC research division of the Keeley Institute of North Carolina has been organized, it was announced today by C. D. CUNNINGHAM, director. Under the supervision of DR. A. E. FORTUNE, the alcoholic research division will make available to industrial physicians, personnel directors, and to management its findings regarding the handling of alcoholic employees. "Until only recently," CUNNINGHAM said, "the alcoholic employee has been ignored by management. Most alcoholics can be rehabilitated and thus make better workers, eliminating the loss of the firm's investment in them. We hope, in our reports to management, to make them aware of this and to offer suggestions, based on our research, for the proper handling of such employees." CUNNINGHAM pointed out that alcoholism is a disease and not something to whisper about, a point established in 1879 by the first Keeley Institute at Dwight, Illinois, but only now being generally accepted. "Industry must become aware of this, for the welfare of the community and the home. To that end we pledge our research division." The institute, located at Greensboro, North Carolina, has been rehabilitating alcoholics for the past 58 years.

Maturity

WARTIME developments in industrial health methodologies have allowed extension of within-plant preventive medicine procedures into the peacetime production scene. (2) Through a concept of selective placement, workers are matched against jobs (physical capacities against physical demands), allowing not only full employment of nearly 100% of applicants, but complete understanding of the worker resulting from physical appraisal, laboratory examinations and personality estimate. (3) Case-finding surveys have been developed in industry in order to detect tuberculosis, syphilis, early heart changes and alterations in visual and aural skills. (4) A knowledgeable understanding of the human relations involved in the group living of industry has led to resolution by the medical director of worksite situational conflicts, providing management with a better method of reversing impaired employee relations. (5) The introduction of rehabilitation procedures, through the cooperation of industry and the Office of Vocational Rehabilitation, has

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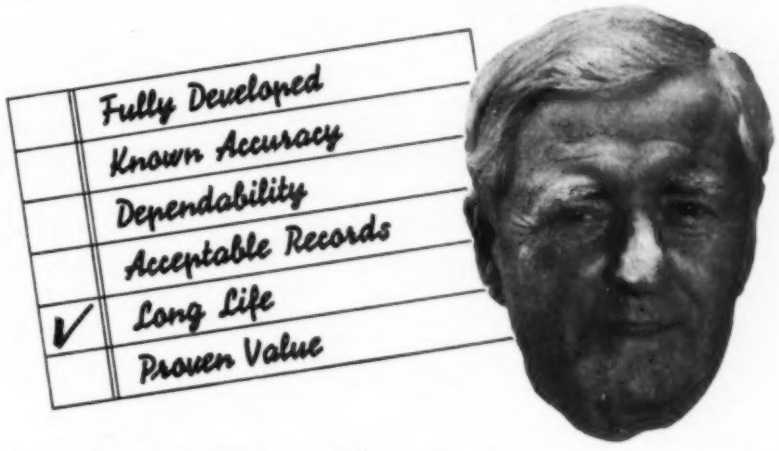

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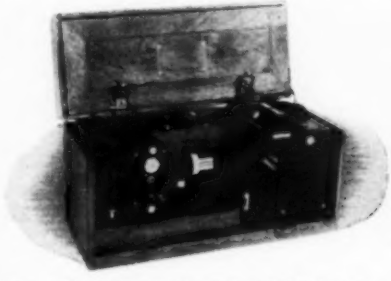

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made for job betterment of the physically limited employee and for the hiring of those with disqualifying defects. (6) Integration of the activities of industrial hygienists, industrial nurses, coupled with health education efforts, has led to an enrichment of the industrial health services. (7) Industrial medicine has given further evidence of coming of age by the creation of a specialized literature, the establishment of criteria for fellowships and residences, and the formation of professional organizations. (8) Through the continued efforts of industrial medical personnel and the preventive medicine procedures introduced by them, full worker health will be maintained, and America's program of expanding industrialization will grow.

—Summary, "Industrial Medicine Comes of Age," by JEAN SPENCER FELTON, M.D., in *West Virginia Med. J.*, September, 1948.

Silicosis

THE following is the authors' summary of a very excellent article, with special reference to conditions in Pennsylvania: "Silicosis is common in Pennsylvania. (2) Anatomic and pathologic changes are described. (3) Dust concentrations constituting a hazard are defined. (4) Control is feasible and depends upon water and ventilation plus a concerted effort of employer and workers. (5) The problem of ascertaining disability and ascribing the true etiology of the disability is discussed at length. (6) Special emphasis is laid upon diagnosis of silicosis and differentiation from tuberculosis, cancer, coccidioidomycosis and other fungous infection and Boeck's sarcoid."

—Authors' summary, "Silicosis," by CARL E. ERVIN, M.D., DALE C. STAHLE, M.D., and PETER B. MULLIGAN, M.D., in *Pennsylvania Med. J.*, August, 1948.

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DR. PILGRIM

NOW making last minute plans for a long vacation, with the checking of the innumerable items and projects to be done before leaving; and finally, to the Overland Limited and off to California....AND enroute reading more mystery stories, and also playing at Oklahoma with MADAME PILGRIM; stepping off at the few stops made, enjoying the sunshine and leisurely walks; and later interested in the mountains and the highest point at Sherman, 8031 feet; and then the trip across the bay and the thrill of the sight....AND met at the Ferry Building by brother EMMETT and sister-in-law EDITH, and thence to their home on Russian Hill and a chat-fest punctuated by after-dinner brandy.... AND next day, much telephoning *re* a trip to the DE FREMERY place at Clear Lake, 120 miles north, and a bus ride around San Francisco, especially visiting points near the Presidio; and then enroute to Clear Lake, with the weather perfect, in a new Plymouth car with GEORGE and NATALIE CHAMBERS, being very comfortable, stopping at St. Helena for soft drinks; and arriving at Anchorage (which is the name of the Clear Lake home of the de Fremery's) and there greeting JIM, RUTH, JEAN and DAVE PEUGH; and noting the many improvements, the building of a garage, installation of electrical current—after which JIM served his famous Buckingham cocktails, and all went swimming—later to come up before dinner with mint juleps, piano accompaniments and, after dinner, under the stars in big chairs with a bonfire.... AND next day, reading "I Love My Doctor," which every practicing physician, intern, and hospital staff member should read, for it is not only excellent and interesting, but also amusing and entertaining, and marking this passage for a quote: "Medicine is a fascinating study and doctors no less so. Before my intimate contact with the profession, I used to think, as many people do, that doctors were superior things, superior in knowledge, power and judgment, given to philanthropy, benevolence and love for the human race. How often had I seen people reverently accept a physician's dumbest remarks about the weather as if they were

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listening to Solomon's wisdom! Even the tobacco companies have turned to the medical men for corroboration, endorsement and popular inducement of a cigarette brand, as if thus offering the public the final irrefutable mark of approval. Even the lowly toidy seat today needs recommendation by the Council of the A.M.A.!" This may be but an example of good hyperbole, nevertheless there are interesting and satirical, but amusing passages....AND then followed days of reading, sunning, sailing in the clippers, with excellent weather, lovely companionship, and exchange of experiences, food for the soul as well as for the stomach; and trips to nearby towns, Lakeport and Kelseyville, going for the mail, meeting various guests from time to time, swimming and sailing—not to forget the contests at Oklahoma and the playing of piano recitals before and after meals or *pro re nata*; and the PEUGHS coming for evening cocktails and dinner, and STELLA DAVIS for several days' visit, and later JAMES JUNIOR and his family of three children, who were constantly in the boats or swimming (CAROL, LEE, JAMES and JACKIE); and later the big BRISTOWS with daughters TONY, NANCY and MARCIA, and NANCY, being 19 and five feet eleven inches with Grecian features, taking a course at the University of California Agricultural School at Davis learning how to raise beef!....AND so the last beautiful days at Anchorage and the necessity of going into San Francisco, bringing a beautiful drive around Clear Lake with a panoramic view from high points; and received at brother EMMETT'S house with good culinary effect as he had created a crab souffle for dinner....AND then across the bay again to the home of DR. ROBERT LEGGE, and meeting MRS. LEGGE, and going around the wonderful gardens at 6 Roble Road, where there are many varieties of foreign trees and 40 varieties of fuchsias, and numerous other kinds of flowers; and here coming DR. CHRIS LEGGO, of C. & H. Sugar, at Crockett, BERT HANMAN, of Berkeley, and DR. EDWARD DART, of Oakland, (recently having established an office in industrial hygiene and medicine); and here again food for the soul as well as for the body, and afterward to see DR. LEGGE'S Ramazziniana, including the original of Ramazzini's diploma from Padua on real sheepskin and much decorated; and after all of which ED DART drove PILGRIM across the bay bridge....AND then were the last days in San Francisco, in which was the seeing of many friends, including DR. JOSEPH VISALLI and DR. JOSEPH, JR., JEAN and JODY, as well as JANE, ED and MARTHA, with cocktails and wine and abalone, piano and liquers mixed; and having dinner at home with the San Francisco SAPPINGTONS, there coming NED ALLEN, SUE ALLEN, BICKFORD BROOKS, and ANNE and CRAIG; and to the farmers' market, and also passing the old City and County Hospital (which was a new one when PILGRIM did an internship there) and for a ride down the peninsula with the HAMMERS, calling on the way at various places, at the LIPMANNS, at the SHU-

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BERTS with their spic-and-span model home, and thence to Palo Alto to see the Stanford campus, especially the Hoover Memorial Library; and taking another ride across the bay with the EARL COLLINS' to visit the CHAMBERS at their beautiful home in the Piedmont Hills, and thence to the Claremont Hotel for early dinner and back to the COLLINS' residence in St. Francis Woods, seeing there ROBERTA and FRANCIS, and playing with young ROBERT who has so ably assisted his grandfather in raising some of the most beautiful dahlias to be found in the Bay region. . . .AND before leaving the west, taking a ride around Sea Cliff, the Legion of Honor, through Golden Gate Park, past Stanford Hospital, and various landmarks, and on one of the last evenings to Grison's for Kansas City steaks, as advertised — here seeing FORD HIGBY—and wherewith were served butter-filled Idaho potatoes, which had a sign on them reading: "Don't Skin Me!—I've been rubbed, I've been scrubbed, I'm as clean as a whistle and a lot tastier—Eat me, skin and all," which was a new wrinkle in cuisine; and next day to Fisherman's Wharf for crab, and a final ride around town, and then to Oakland to DRS. FRANK and EVA MISSNERS for the last dinner in the west, and once more embarking across the bay on the ferry, with that unexcelled view, and again on the Overland Limited; and here, finishing some reading of mystery stories and playing Oklahoma with MADAME PILGRIM, and back to Chicago heat in the 90's; next coming adjustments with transportation and various routines, among them the regular check-up at which again was said to be "*in status quo*". . . .AND with correspondence and various other activities, and sending regrets to the Chairman of the Permanent Committee of the Ninth International Congress on Industrial Medicine, about not being able to go to London and take the chairmanship of the Session on Organizing Medical Services, and sending a similar message of regret to DRS. RONALD LANE and RICHARD SCHILLING for that because of many commitments in this country PILGRIM would be unable to attend the dinner at the Royal Air Force Club on Thursday evening, September 16 . . . .AND into the routine of office, projects, laboratory complexes, going over various manuscripts and galleys, with discussion of many new problems, including a conference with DR. CARL PETERSON on recent ideas about workmen's compensation administration; and thence to South Shore Country Club to see the lawn bowling and to sun again; and sitting with the Board of Directors of the Chicago Section of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, arranging for the coming meetings and the program for the fiscal year. . . .AND now arranging for trips to New York City and into western Kentucky, the former the largest metropolis on the continent and the latter among the smaller of the towns in the south, of which more later. . . .

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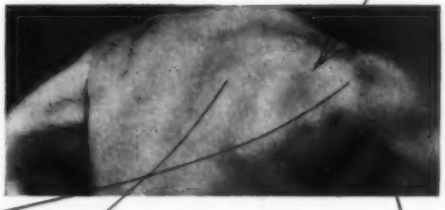

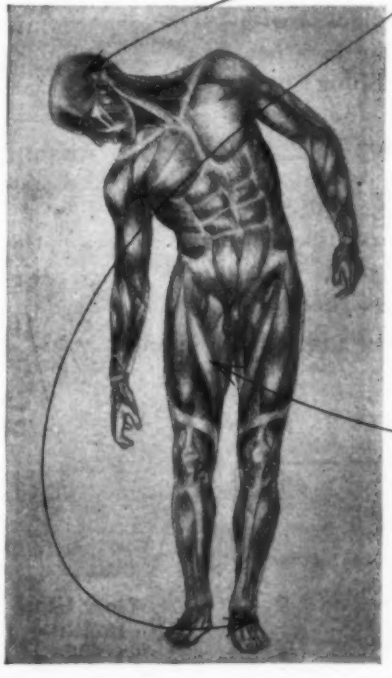

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M. D. _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

Strong Cobb & Co. Inc.
(Professional Products Division)
Cleveland 4, Ohio
PHARMACEUTICALS SINCE 1833

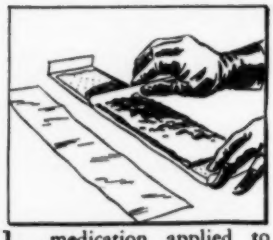
For BURNS, ABRASIONS and SURFACE WOUNDS

VISIBAND

....The New-Type Dressing....

STERILIZED
TRANSPARENT
NON-ABSORBING
NON-ADHERING

VISIBAND is an entirely new idea in bandages . . . a transparent, non-adhering dressing for use in the treatment of burns and abrasions, and used for skin grafts or any surface wound. ***VISIBAND*** consists of two strips of specially prepared, sterilized cellophane film. One strip, used as the base for medication, is perforated; the other strip is plain. The ease and simplicity of application is illustrated at the left. Simple bandages hold ***VISIBAND*** in place.



1 . . . medication applied to **perforated** *Visiband.*

2 . . . place over injured area . . . medicated side UP.

3 . . . apply **unperforated** *Visiband* over medication.

•

VISIBAND is non-adhering . . . is removed without pain or discomfort.

VISIBAND is transparent . . . permits inspection of wound without removal of dressing.

VISIBAND provides germ-proof housing over any desired area.

VISIBAND is economical . . . requires less medication than other types of bandage due to non-absorbency.

VISIBAND serves to prolong the effective period of medication, which melts with body heat and flows through the small holes in the perforated strip.

VISIBAND is quicker to apply . . . requires less frequent changes than other dressings.

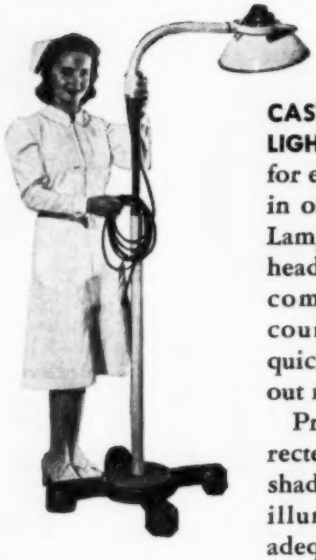
In sterilized individually sealed envelopes. $2.25 per box of 1 dozen.

SOLE DISTRIBUTORS

THE QUICAP COMPANY, INC.
Dept. C8, 233 Broadway, New York 7

Hospital Lighting for Office or Clinic . . .

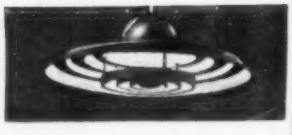
AT MODERATE COST



CASTLE No. 46 "ALL-PURPOSE" LIGHT. The No. 46 is designed for examining and operating . . . in offices, clinics and surgeries. Lamphead extends to 75″ (above head level), lowers to 48″ for compact storage. Internally counterbalanced for simple, quick, vertical adjustment without manual locks or clamps.

Provides soft, cool, color-corrected light . . . glareless and shadow-reducing . . . sufficient to illuminate the deepest cavity adequately.

CASTLE "G-V" FOR GENERAL LIGHT. The Castle "G-V" (General Vision) Light bathes the entire room in a soft, glareless radiance that dispels eye-straining shadows and lighting contrasts . . . yet concentrates sufficient intensity of light at the table for all surface examination, treatment or repair work.



CASTLE NO. 1 SPOTLIGHT provides cool, color-corrected, glareless, shadow-free light to adequately illuminate the deepest cavity. Mobile, easily adjusted, and inexpensive.

FOR FULL DETAILS see your Castle dealer, or write: Wilmot Castle Co., 1161 University Ave., Rochester 7, New York.

Castle **LIGHTS AND STERILIZERS**

BRECK HAND CLEANER

Workers who handle chemicals and many industrial materials that are difficult to remove from the skin with ordinary soap, will find Breck Hand Cleaner effective yet mild. Breck Hand Cleaner removes synthetic dyes, petroleum oils, pitch, and coal tar without defatting the skin. Harsh and gritty cleaners are unnecessary at the end of the day's work, if Breck Hand Cleaner is used.

Literature and samples will be sent upon request.

JOHN H BRECK INC • MANUFACTURING CHEMISTS • SPRINGFIELD 3 MASSACHUSETTS
CANADIAN ADDRESS • 310 SLATER STREET • OTTAWA

LOOKING FORWARD

WITH OCCY-CRYSTINE PRESCRIBERS

Upon the occasion of the thirtieth anniversary of the successful formulation of Occy-Crystine by a practicing physician, the makers of this product pause to convey their appreciation to the many members of the profession—who, by their numerous prescriptions and voluntary communications over the past three decades, have testified to its therapeutic efficacy and to the beneficial results derived from personal and clinical use.

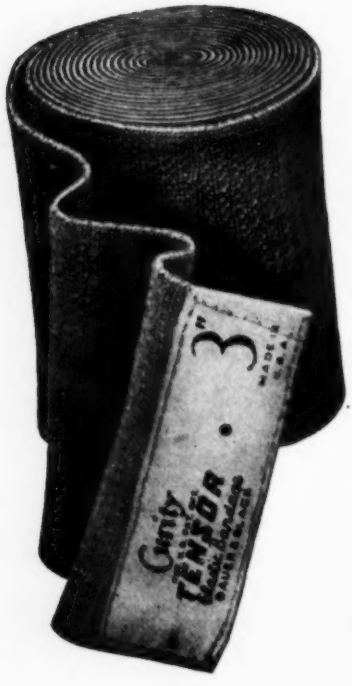
During the years ahead, with the help and guidance of leaders in the pharmaceutical, biochemical and physiological fields, and in the light of ever newer knowledge, we shall continue to keep reports on Occy-Crystine therapy fully abreast of the latest findings on the value of this saline cathartic, cholagogue, diuretic and sulfur-bearing agent.

C. P. Bunts M.D.

MEDICAL DIRECTOR

1918 ~ 1948 ~~ 30 YEARS YOUNG

TENSOR* ELASTIC BANDAGE



IS WOVEN WITH

Live Rubber Thread

THAT'S WHY rubberless bandages can't match it for elasticity. That's why TENSOR stretches two and one-third times its own length! *Live rubber* warp threads, covered with soft cotton yarn, "give" with the movements of bandaged parts, yet provide therapeutic support, for *any* elastic bandage use.

Patients will appreciate TENSOR; recommend it with confidence.

TENSOR:

- exerts uniform, controlled pressure without binding.
- has constant elasticity—you don't find it in rubberless bandages!
- *stays put*—no need for frequent readjustments. Affords comfort—because of quick and easy "give."
- is inconspicuous. Women patients will wear it because it's neutral-colored, and doesn't make bulky outlines.
- maintains elasticity despite repeated laundering.

*Reg. U. S. Pat. Off.

In 2 - 2½ - 3 - 4 and 6 inch widths by 5½ yards stretched.

THERE IS NO BETTER ELASTIC BANDAGE THAN TENSOR!

A product of

BAUER & BLACK

Division of The Kendall Company, Chicago 16

TENSOR *Elastic* BANDAGE

In the tight, uncomfortable bronchial cough accompanying colds, influenza or bronchitis, Synephricol provides the decongestion necessary to permit free breathing. and elimination of excess mucus.

Synephricol is expectorant, and more—it thins the viscous mucoid bronchial secretions and it decreases bronchial irritation by sympathomimetic action.

EACH TEASPOONFUL OF PLEASANT FLAVORED SYNEPHRICOL CONTAINS:

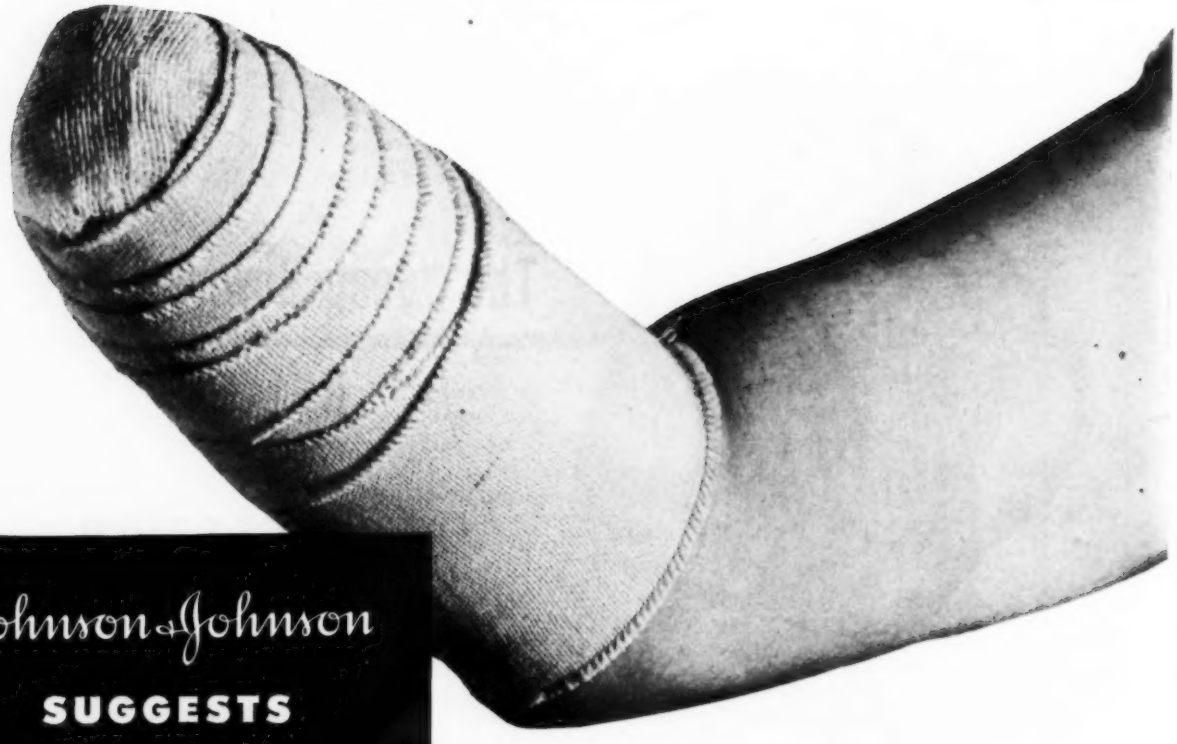
Codeine phosphate	8.7 mg.
Neo-Synephrine® hydrochloride	5.0 mg.
Potassium guaiacol sulfonate	70.0 mg.
Ammonium chloride	70.0 mg.
Menthol	1.0 mg.
Chloroform	0.0166 cc.
Alcohol	8%

Exempt narcotic

Average adult dose: 1 or 2 teaspoonfuls every four hours.
Supplied in bottles of 1 pint and 1 gallon.

Winthrop-Stearns INC.
NEW YORK 13, N. Y. WINDSOR, ONT.

SYNEPHRICOL and NEO-SYNEPHRINE, trademarks reg. U. S. & Canada



Johnson & Johnson

SUGGESTS

ADAPTIC

for pressure dressings

Among the medical contributions of the war was the use of pressure bandaging as part of the modern therapy for amputations and burns. One of the most important features of this type of treatment is sustained, evenly distributed physiologic pressure.

This pressure may readily be obtained through the use of ADAPTIC Elastic Bandages. These provide firm, even elastic compression without danger of circulatory embarrassment, since the gentle tension of the bandages makes them readily adaptable to changing physiologic needs.

Doctors have found many uses for ADAPTIC —the Johnson & Johnson Elastic Bandage . . . for strains, sprains, varicose veins, radical mastectomy and other applications.

ADAPTIC is made of fine, long-staple cotton which stretches without narrowing when wound. Provides a smooth, close-conforming supporting bandage. This makes it easy for patients to carry out the simpler home applications—saving you unnecessary calls. As the ADAPTIC can be laundered and reused many times, its over-all cost is comparatively low. Available in 2", 2½", 3" and 4" widths.

ADAPTIC—the Johnson & Johnson

ELASTIC BANDAGE

~~D~~ysmenorrhea

In a recent study, Long used Edrisal to control dysmenorrhea in 630 factory workers: **90% reported relief.** Indust. Med. 15:679

In another study, Hindes used Edrisal for dysmenorrhea in approximately 200 office employees: **96% were benefited.** Indust. Med. 15:262

Each Edrisal tablet contains acetylsalicylic acid (2.5 gr.), phenacetin (2.5 gr.), and Benzedrine* Sulfate (2.5 mg.). For samples and full information, write us at 445 Arch St., Philadelphia 5, Pa.

Smith, Kline & French Laboratories, Philadelphia

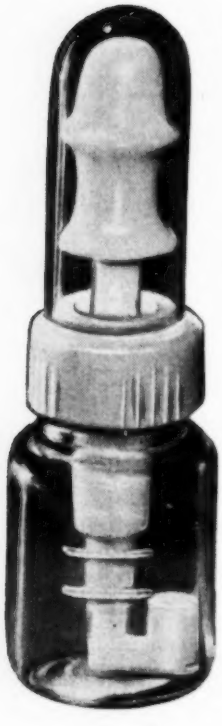
Edrisal

its dual action relieves pain, lifts mood

*T. M. REG. U.S. PAT. OFF. FOR RACEMIC AMPHETAMINE SULFATE, S.K.F.

NEW JET METHOD

. . . makes
nasal medication
more effective



The JETOMIZER was especially designed to deliver measured medication high in the nose. It overcomes the disadvantages of drops and sprays—safely, with convenience and simplicity of use.

ACCURATE—Working against gravity, the Jetomizer delivers a *measured* jet (2 to 3 drops) high in the nose.

EFFECTIVE—The liquid goes high into the nasal cavity and spreads over the mucosa where medication is desired.

SAFE—No injury to delicate tissues; *no air* is forced into nasal passages, with attendant risk of mechanical dilation.

EASY TO USE—Inconspicuous and non-messy. Reclining position is unnecessary. Parkinson or Proetz positions can be avoided. Patients gladly cooperate. *Especially easy to use on infants and children.*

CONVENIENT—Sanitary cap protects the nozzle against contamination—makes the Jetomizer easy to carry in purse or pocket.

JETOMIZER®

NASAL APPLICATOR, WYETH

WYETH INCORPORATED
PHILADELPHIA 3, PA.

Wyeth

FIBERGLAS*

. . . Clothing Interliners Suggested to Relieve Eczema

Use of non-allergenic Fiberglas clothing interliner to provide warm winter clothing "that may prove invaluable in the care of the atopic child" has recently been reported†.

"One of the major problems in environmental control in the colder parts of the United States," says the report, "lies in providing children with adequate protection by means of clothing which does not contain wool, particularly with regards to snow suits and other articles of winter apparel."

This has lately been achieved, the report points out, by using an outer and an inner layer of tightly woven cotton cloth over Fiberglas clothing interliner.

"This is said to be superior to wool, weight for weight, as regards warmth, and such clothing may prove invaluable in the care of the atopic child."

Fiberglas-interlined clothing, for adults as well as children, is made by several garment manufacturers, †† to whom Owens-Corning Fiberglas Corporation supplies Fiberglas clothing interliner.

* * *

Several applications of standard Fiberglas products are described in the second edition of "Pioneering Uses of Fiberglas Materials in Medicine". Samples and a listing of the medically significant characteristics are also included.

Fiberglas may be helpful in some of your investigations or in solving some of your problems. Write for a copy of this interesting booklet today. Owens-Corning Fiberglas Corporation, Dept. **2029**, Toledo 1, O. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

†Glaser, Jerome, M.D. Treatment of eczema (atopic dermatitis) in infancy. J.A.M.A. 137: 6 (June 5) 1948, pp. 527-531.

††*Manufacturers:* Albert Richard Division of Fried, Ostermann Company, 1645 South Second Street, Milwaukee 4, Wisconsin; Cresco Mfg. Co., 703 Union Street, Ashland, Ohio; Excel Garment Manufacturing Company, 310 Second Avenue, N., Minneapolis 1, Minnesota; Gordon & Ferguson, Inc., 230 East Fifth Street, St. Paul 1, Minnesota; Klinkerfues Brothers Co., 910-7 East Seventh Street, St. Paul 6, Minnesota. *Retail:* Montgomery Ward, Chicago (see pp. 421 and 427 of Fall and Winter 1948-1949 Catalog). Names of retail clothing and department stores may be obtained from any of the manufacturers listed above.

OWENS-CORNING
FIBERGLAS

*FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

Breakfast Adequacy and Somatic and Psychic Stability

The three-meal schedule of daily eating, with a heritage of intuitive origin, now is acknowledged vital to an adequate smoothly flowing nutrient stream for providing the metabolic needs throughout the day. Of corollary importance, is the growing conviction that the morning breakfast should provide ¼ to ⅓ of the day's burden of food intake. Good somatic and psychic functioning during the forenoon hours are thereby nutritionally insured. Hyponutritional manifestations of untimely hunger, fatigue and irritability are minimized.

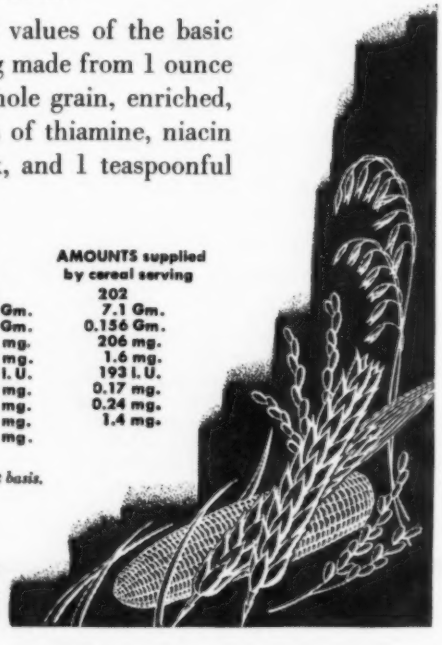
A simple application of these nutrition principles is a widely accepted basic breakfast pattern consisting of fruit or fruit juice, cereal (hot or ready to eat), milk, bread and butter. The serving of cereal with milk and sugar is an important and appetizing feature of this basic breakfast pattern. It provides biologically complete proteins, carbohydrates for caloric energy, important minerals and vitamins—all in excellent proportion. Should the portions usually consumed provide less than ¼ or ⅓ of the day's total nutriment requirements, then they can be augmented with eggs, breakfast meats or other suitable foods.

The table depicts the nutrient values of the basic breakfast and of the cereal serving made from 1 ounce of ready-to-eat or hot cereal* (whole grain, enriched, or restored to whole grain values of thiamine, niacin and iron), 4 fluid ounces of milk, and 1 teaspoonful of sugar.

The presence of this seal indicates that all nutritional statements in this advertisement have been found acceptable by the Council on Foods and Nutrition of the American Medical Association.

BASIC BREAKFAST	TOTALS supplied by Basic Breakfast	AMOUNTS supplied by cereal serving
Orange Juice, 4 oz.; Ready-to-eat or Hot Cereal, 1 oz.; Whole Milk, 4 oz.; Sugar, 1 teaspoon; Toast (enriched, white), 2 slices; Butter, 5 Gm. (about 1 teaspoon); Whole Milk, 8 oz.		
	CALORIES..... 611	202
	PROTEIN..... 20.7 Gm.	7.1 Gm.
	CALCIUM.....0.465 Gm.	0.156 Gm.
	PHOSPHORUS .... 488 mg.	206 mg.
	IRON ..... 3 mg.	1.6 mg.
	VITAMIN A..... 1074 I. U.	193 I. U.
	THIAMINE..... 0.52 mg.	0.17 mg.
	RIBOFLAVIN..... 0.87 mg.	0.24 mg.
	NIACIN ..... 2.3 mg.	1.4 mg.
	ASCORBIC ACID .. 64.8 mg.	

*Composite average of all breakfast cereals on dry weight basis.



CEREAL INSTITUTE, INC.

A research and educational endeavor devoted to the betterment of national nutrition.

135 South La Salle Street • Chicago 3

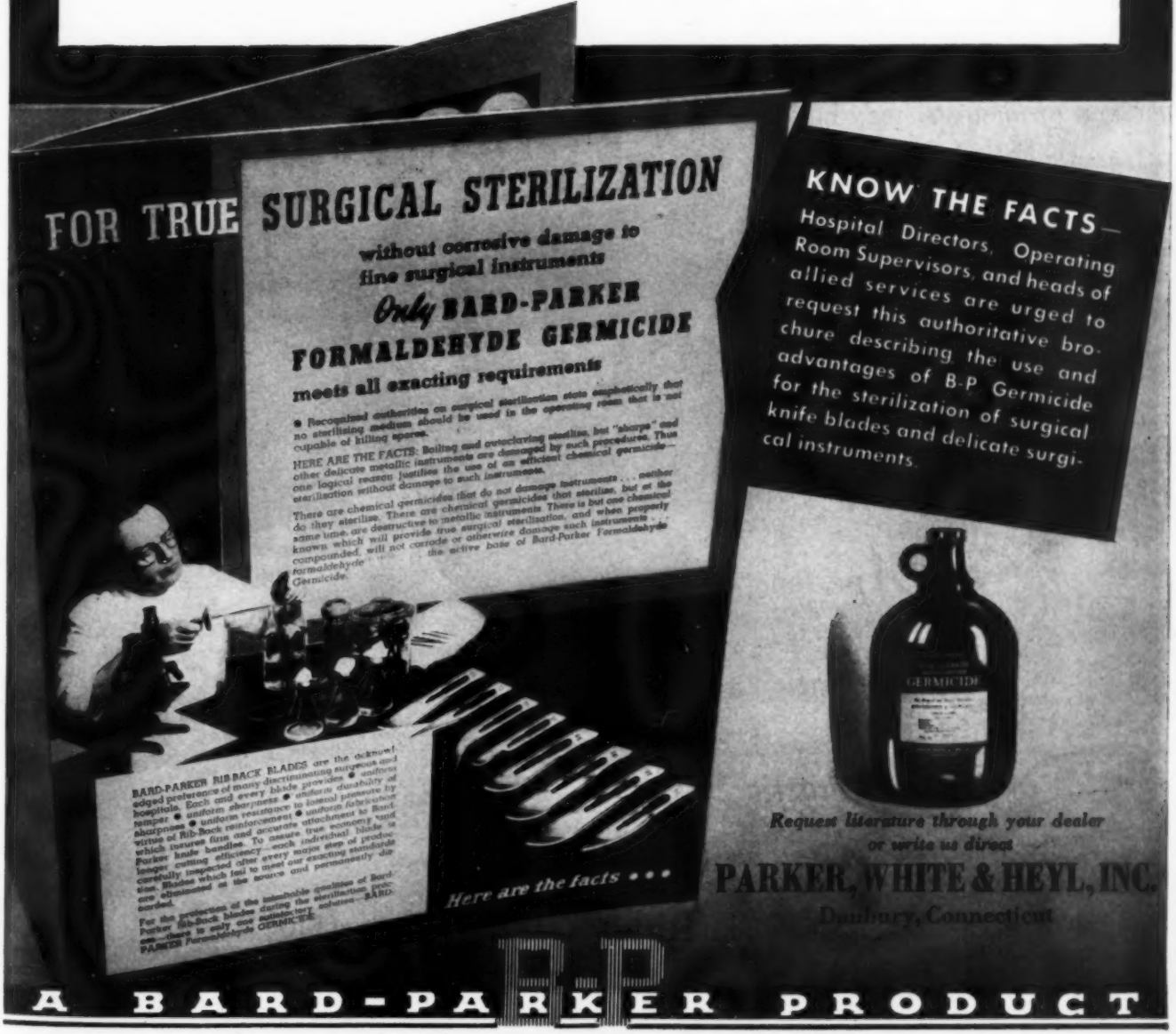
FOR THIS VITAL PROBLEM

. . . only one satisfactory *SOLUTION*

BARD-PARKER FORMALDEHYDE GERMICIDE

TRUE SURGICAL STERILIZATION of delicate steel instruments and keen cutting edges must embrace the total destruction of vegetative bacteria, spore-formers and their spores. Surgical sterility must be attained within a reasonably short period of time to be practical for hospital purposes. The medium or method employed should offer complete protection against rust or corrosive damage to the factory-new qualities of such instruments, leaving their efficiency and life expectancy unimpaired.

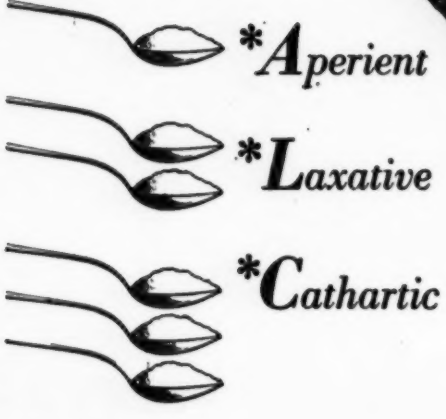
The bactericidal and sporicidal potency of B-P Germicide accomplishes the destruction of pathogenic vegetative bacteria within 5 minutes . . . the most highly resistant spores of *Cl. tetani* in 3 hours. It will not rust, corrode or otherwise damage delicate steel instruments or keen cutting edges. NO METHOD OR MEDIUM EXTANT PROVIDES THESE COMBINED, EQUIVALENT PROPERTIES.


FOR TRUE SURGICAL STERILIZATION
without corrosive damage to fine surgical instruments
Only BARD-PARKER FORMALDEHYDE GERMICIDE
meets all exacting requirements
KNOW THE FACTS—
Hospital Directors, Operating Room Supervisors, and heads of allied services are urged to request this authoritative brochure describing the use and advantages of B-P Germicide for the sterilization of surgical knife blades and delicate surgical instruments.
GERMICIDE
Here are the facts . . .
Request literature through your dealer or write us direct
PARKER, WHITE & HEYL, INC.
Danbury, Connecticut
B-P
A BARD-PARKER PRODUCT

easy to administer, pleasant to take prompt to act

A balanced saline combination which acts by simple osmosis to dilute fecal residue and produce soft fluid bulk . . .

Stimulates peristalsis and promotes *speedy* but *gentle* evacuation.



*Aperient

*Laxative

*Cathartic

*Average dose

Product of BRISTOL-MYERS

19 West 50 Street, New York 20, N. Y.

RIASOL

Scores a Touchdown IN PSORIASIS

The fight may be tough, but RIASOL frequently scores the touch-down in psoriasis. Because it really works in most cases, this unique formula enjoys the distinction of being a "choice" prescription when psoriasis strikes.

With the very first application, RIASOL goes to work on the ugly, psoriatic lesions. Usually they clear up promptly and the scales gradually disappear. Recurrences are often minimal. Simple and pleasant to use, RIASOL provides cosmetic relief and mental assurance—all-important advantages.

RIASOL contains 0.45% mercury chemically combined with soaps, 0.5% phenol and 0.75% cresol in a washable, non-staining, odorless vehicle.

Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary. After one week, adjust to patient's progress.

Never advertised to the laity, RIASOL is available in 4 and 8 fld. oz. bottles, at pharmacies or direct. Write for your free clinical package.

MAIL COUPON TODAY —
PROVE RIASOL YOURSELF

Before Use of Riasol

After Use of Riasol

SHIELD LABORATORIES IM-10-48
12850 Mansfield Avenue, Detroit 27, Michigan

Please send me professional literature and generous clinical package of RIASOL.

_____ M.D. _____ Street

City _____ Zone _____ State _____

Druggist _____ Address _____

RIASOL for PSORIASIS

THIS SUGGESTION MAY BE OF VALUE FOR YOUR THROAT PATIENTS:

When cigarette smoking is a factor in throat irritation, many leading nose and throat specialists suggest* to their patients a choice of 3 alternatives:

1. Stop Smoking,
2. Smoke less,
3. *Change to* Philip Morris!

• Philip Morris is the *only* cigarette proved definitely and measurably less irritating!** Perhaps you too will find it worth while to suggest "*Change to* PHILIP MORRIS."... by far the wisest choice for *everyone* who smokes.

PHILIP MORRIS

Philip Morris & Co., Ltd., Inc.
119 Fifth Avenue, N. Y.

DO YOU SMOKE A PIPE? We suggest an unusually fine blend — COUNTRY DOCTOR PIPE MIXTURE. Made by the same process as used in the manufacture of Philip Morris Cigarettes.

**Completely documented evidence on file.*
***May we send you copies of these published studies:*

Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60; Proc. Soc. Exp. Biol. and Med., 1934, 32-241; N. Y. State Journ. Med., Vol. 35, 6-1-25, No. 11, 590-592.

IDLE WORK-HANDS *play costly tunes . . .*

Skilled hands, temporarily incapacitated, are responsible for millions of dollars in industrial losses every year. Skin ailments, resulting from frequent exposure to industrial irritants **plus** the use of caustic washing soaps, are sour notes which throw production schedules off-key through excess absenteeism. Your plant is no exception in requiring safeguards against these dangers.

West's Lan-O-Kleen hand cleanser, superfatted with a high content of lanolin, plays an important part in a dermatitis prevention program. Made of fine corn meal, containing no harsh, gritty substances or excess alkali, Lan-O-Kleen thoroughly yet gently removes stubborn dirt, grime and grease from sensitive skins. In addition, it has beneficial emollient properties resulting from superfatting with lanolin.

Decide now to adopt the Lan-O-Kleen wash-up habit in your plant. Consult one of West's country-wide staff of sanitation specialists. He'll be glad to give you further details.

WEST LAN-O-KLEEN HAND CLEANSER

SAVE SOAP AND YOU SAVE EXTRA MONEY!

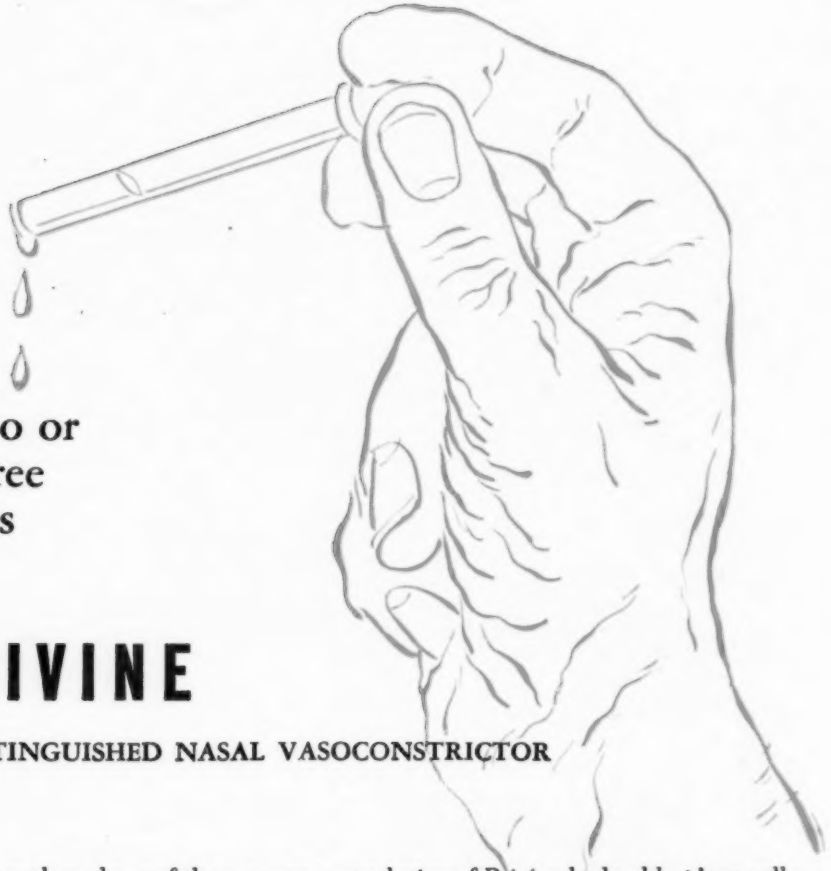
A modern, economical Lan-O-Kleen Dispenser regulates the amount of soap used—*prevents costly waste.* Readily adaptable for Bradley Fountains.

Send for this handsomely illustrated folder. It contains details of the dispenser, the healthful cleansing action of Lan-O-Kleen and complete washing instructions.

PRODUCTS THAT PROMOTE SANITATION

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.



only
two or
three
drops

PRIVINE

A DISTINGUISHED NASAL VASOCONSTRICTOR

high potency Only two or three drops of the 0.05 per cent solution of Privine hydrochloride usually give prompt and complete relief of nasal congestion and hypersecretion.

prolonged action The effect of each application of Privine provides two to six hours of nasal comfort, thus avoiding the inconvenience of frequent re-application.

bland and non-irritating Privine is prepared in an isotonic aqueous solution buffered to a pH of 6.2 to 6.3. Artificial differences in osmotic pressure between solution and epithelium are avoided; stinging and burning are usually absent.

relatively free from systemic effects Although a sedative effect is occasionally noted in infants and young children – usually after gross overdosage – Privine is generally free of systemic effect. The absence of central nervous stimulation permits the use of Privine before retiring without interfering with restful sleep.

• CIBA PHARMACEUTICAL PRODUCTS, INC., SUMMIT, NEW JERSEY

Privine 0.05 per cent for all prescription purposes; 0.1 per cent strength reserved for office procedures.

Ciba

PRIVINE (brand of naphazoline) Trade Mark Reg. U.S. Pat. Off.